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Health Care Financing Review

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National health expenditures, 1985

Outcomes of surgery in the Medicare aged population: Rehospitalization after surgery

Case-mix reimbursement for nursing home services: Simulation approach

Factors affecting appropriateness of hospital use in Massachusetts

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Prospective payment for Medicare skilled nursing facilities: Background and issues

Health Care Financing Administration

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Health Care Financing Review

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The Health Care Financing Administration (HCFA) was established to combine health financing and quality assurance programs within a single agency. HCFA is responsible for the Medicare program, Federal participation in the Medicaid program, and a variety of other health care quality assurance programs.

The mission of the Health Care Financing Administration is to promote the timely delivery of appropriate, quality health care to its beneficiaries—approximately 50 million of the Nation's aged, disabled, and poor. The agency must also ensure that program beneficiaries are aware of the services for which they are eligible, that those services are accessible and of high quality, and that agency policies and actions promote efficiency and quality within the total health care delivery system.

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The editorial policy of the *Health Care Financing Review* is comparable to that of other professional journals. The Executive Editor decides which of the submitted articles are relevant to the health care financing field in general and to the Health Care Financing Administration in particular. *Review* readership is encouraged to submit appropriate manuscripts for consideration.

The Associate Editors manage the peer review process and are responsible for the professional quality of *Review* articles. All articles of interest are sent to a panel of peers with expertise in the subject areas addressed, and they review articles in terms of substance, originality, validity, clarity, and significance. Their comments, along with those of the Associate Editors, are transmitted to the authors. Authors whose manuscripts are accepted for publication may be asked to make revisions based on these critiques.

The Managing Editor has responsibility for the publications standards of the *Review* and the editorial quality of the articles published, and the editorial staff work with authors on preparing their articles for publication.

The *Review* is published on a quarterly basis and each issue represents a balance between contributors from inside and outside the government. Some selective scheduling for publication is necessary because more articles are usually accepted each quarter than can be published in any given issue. However, we will publish all articles of interest that are accepted through the peer review process as space is available.

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National health expenditures, 1985

by Daniel R. Waldo, Katharine R. Levit, and Helen Lazenby

Slower price inflation in 1985 translated into slower growth of national health expenditures, but underlying growth in the use of goods and services continued along historic trends. Coupled with somewhat sluggish growth of the gross national product, this adherence to trends pushed the share of our Nation's output accounted for by health spending to 10.7 percent. Some aspects of health spending changed: Falling use of hospital services was offset by rising hospital profits and increased use of other health care services. Other aspects remained the same: Both the public sector and the private sector continued efforts to contain costs, efforts that have affected and will continue to affect not only the providers of care but the users of care as well.

Overview

Health spending in the United States reached $425 billion in 1985, up 8.9 percent from the previous year. This growth was the slowest in two decades, but the slowdown was attributable almost entirely to lower growth of prices.

National health expenditures amounted to $1,721 per person in 1985. That figure does not represent the expenditure of a "typical" person, but rather a commitment of resources on a national level. Of the funding for health expenditures, 59 percent came directly from the private sector, mostly through private health insurance and from consumers and their families. The remaining 41 percent was funded through government programs, principally the Medicare and Medicaid programs.

Slower price inflation was the cause of slower growth in health spending. The medical care component of the Consumer Price Index (CPI) was 6.2 percent higher in 1985 than it had been in 1984. It maintained the same rate of growth as from 1983 to 1984. Equally encouraging, at least to purchasers of health care, was a marked trend toward price competition in the health care market. The rapid spread of competition among providers of care for "market share" may have served to moderate the rise of health care prices even beyond the extent indicated by the "list" prices measured in the CPI.

Although a slowdown in the growth of prices was welcome news to consumers and insurers alike, there were at least two troubling signs to be seen. First, despite that slowdown, medical prices still outpaced prices of other goods and services. To a great extent, this type of price behavior is expected. Health care is largely a service, and in a mature economy, service prices tend to rise more rapidly than do commodity prices. However, the inevitability of an economic phenomenon does little to ease the burden it imposes. The burden that relatively high medical care price inflation imposes is that, unless the combined growth of relative prices and of the quantity of goods and services consumed per capita is less than the growth of real income per capita (currently about 2 or 3 percent per year), a larger and larger share of income will be consumed for health care. This clearly has been the case in the United States, as health spending reached 10.7 percent of the gross national product (GNP), a measure of our Nation's income. Little relief appears to be in sight.

The second troubling observation about medical care price inflation is that it seems to be heating up again. Starting in mid-1985, monthly CPI figures began to show more and more growth, suggesting that the deceleration of price inflation experienced in 1985 will not be repeated in 1986.

The amount spent for health in 1985 increased over 1984 levels even after adjustment for the effects of price growth. This can be seen in either of two ways. First, growth of "real" spending for personal health care—expenditure change excluding the effects of health care price inflation—was very much along historical trends. Second, the "opportunity cost" of health care spending—spending deflated by the general price level to measure the amount of other goods and services U.S. consumers had to forgo in order to purchase health care—increased 5.4 percent in 1985. Both measures point to an increase in the share of our Nation's physical consumption devoted to health.

Spending for health has been cutting more and more deeply into the Nation's pocketbook. From about 6 percent of GNP in 1965, national health expenditures grew to equal 10.7 percent of GNP in 1985, nearly doubling the claim on resources in two decades. The relatively rapid change from 1984 to 1985 in the share of GNP going to health can be attributed to two phenomena. In 1984, GNP grew very strongly after a 2-year recession but health spending, and hospital spending in particular, decelerated as providers and consumers accustomed themselves to changes in the financing of such care. In addition, GNP growth in 1985 was one-half of the 1984 growth. Prices and real growth decelerated, but health care price inflation did not decelerate nearly

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as much, and real growth increased a little. The decline in the share of GNP going to health in 1984 appears to be a one-time blip in the historic trend rather than the start of a new trend.

It is perhaps some consolation that the United States is not alone in its struggle to determine the proper level and mix of health care consumption. Most other industrial countries in the world are facing the same issue, adopting different approaches in attempting to find a solution. From Great Britain's nationalized health industry, through the reliance of France and West Germany on the social security system, to U.S. dependence on the private sector, a variety of health delivery and financing models have been developed. Whether they will accomplish the same goal—optimal access to efficiently produced care—is yet to be seen.

That real growth of health spending has followed a fairly even path does not alter the fact that the health care industry has undergone change in the recent past. Although minor in comparison with the structural upheaval of other industries in the United States, such as that faced by the steel and air travel industries, the changes seen in the health industry are remarkable in light of the strong traditional attitudes of health care providers and consumers. Driven by cost considerations, insurers and other third parties have banished, perhaps forever, an unflinching reliance on providers of care to determine not only the correct treatment but the correct cost of that treatment as well. The new "wave" of health care can be seen through changes in the delivery of care (notably, the deemphasis of hospital care) and in the financing of care (a heightened concern with the "bottom line").

Changes in delivery of care

Following years of unrelenting increases in hospital use, the financial pinch felt by employers and government health program

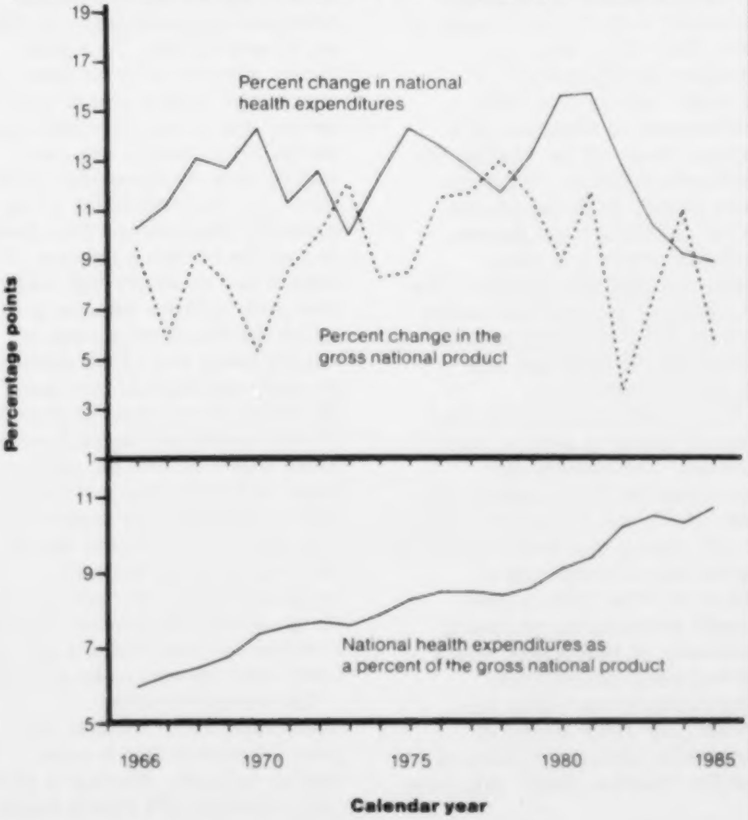
Gross national product revisions

In December 1985, the U.S. Department of Commerce announced the results of their periodic revision of the gross national product (GNP) estimates. The new estimates are substantially higher than previous figures because of three types of changes: definitional changes (none related to health), new methods of adjusting tax return information, and the inclusion of new or revised data. For example, of the $111 billion upward revision to GNP for 1984, $30 billion are attributable to changes in definitions, $44 billion to adjusted tax information, and the remainder to revised data (Bureau of Economic Analysis, 1985).

The effect of these revisions, not yet incorporated in the national health expenditures series, is to lower the share of GNP accounted for by health in the past as well as present. As we undertake our own "benchmark" of national health expenditures estimates, we may well revise spending levels upward for some of the same reasons that the gross national product was increased, returning health's share of GNP to somewhere near its previous levels.

Figure 1

Percent change in national health expenditures and gross national product, and national health expenditures as a percent of gross national product: Calendar years 1966-85



SOURCE: Health Care Financing Administration, Office of the Actuary. Data from the Division of National Cost Estimates.

Spending for health generally has increased faster than has the gross national product (GNP), so that health expenditures are rising as a share of GNP.

managers early in the 1980's resulted in sharp reversals of historic trends. Growth of expenditures for hospital services, which comprise almost one-half of all spending for personal health care and which had been growing more rapidly than other forms of health spending, slowed dramatically. Preadmission testing in outpatient departments and physicians' offices replaced early admission to the hospital, and the length of hospital stays was reduced. Procedures that had been performed on an inpatient basis were moved to outpatient and office settings. In some cases, financial pressures to move to lower cost settings were coupled with the diffusion of affordable technology that permitted such moves.

Industry statistics indicate the remarkable turnaround in use of hospital facilities over the last 5 years. After an average growth rate of 2.5 percent from 1967 to 1979, the number of admissions to community hospitals dropped an average of 1.0 percent per year from 1979 to 1985 (Hospital Data Center, 1986). A reversal in the growth trend for inpatient days was just as pronounced, from a pre-1980 average growth of 1.5 percent to a post-1980 average of −2.3 percent. Further, it was the population under 65 years of age for whom admissions and days first began to drop. Use of hospital care by the population 65 years of age or over did not begin to fall until 1984, but admissions and inpatient days for the population under 65 years of age had begun to drop as early as 1982.

What became of the care that would have been provided to those "lost" admissions? To some extent, it never was provided. Second opinions and use reviews eliminated consumption of some services. Other care was provided through nonhospital providers: nursing homes, home health agencies, ambulatory care centers, and traditional practitioner offices. It is clear from the growth of price-deflated spending for personal health care that the U.S. population is not consuming less health care goods and services than before, either in total or per capita.

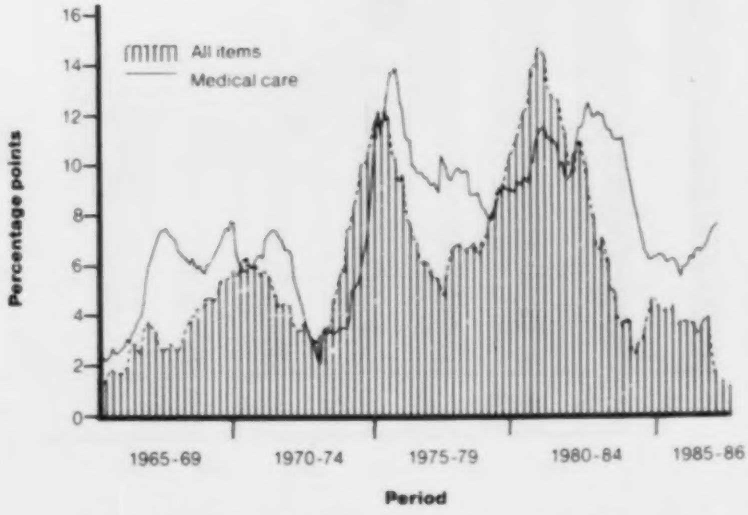
During the last few years, hospitals have benefited from a slowdown in the growth of prices they paid for inputs. These benefits have been shared with consumers in the form of slower price growth for hospital services. The Consumer Price Index component for hospital care, one measure of output prices, rose 6.4 percent from 1984 to 1985, the smallest change recorded for that component since its creation in 1977.

Price indexes may overstate the actual rate of inflation. Increasing competition in the health care industry has led both distributors and hospitals to engage in price discounting, a phenomenon that is not captured in the CPI or the Producer Price Index. Paying something other than "list" prices is not new: Blue Cross and other insurers (and, until the advent of the prospective payment system, Medicare) based reimbursement on the cost of the service rather than its price. Still, the recent proliferation of preferred provider organizations has extended price discounting to many smaller insurers, including self-insured businesses. Further, heightened competition for customers among product distributors has combined with hospitals' exercise of purchasing power to create widespread discounting of prices paid by hospitals. Thus, even the official estimates of price inflation may overstate the growth of hospital prices.

Despite a drop in the number of admissions and inpatient days during the last few years, hospital profits have increased, at least in the aggregate. Industry statistics for 1985 show that community hospital income was 5.9 percent greater than expenses, part of a

Figure 2

Percent change in the Consumer Price Index from the same month of the previous year for all items and medical care: 1965-86



SOURCE: Health Care Financing Administration, Office of the Actuary: Data from the Division of National Cost Estimates.

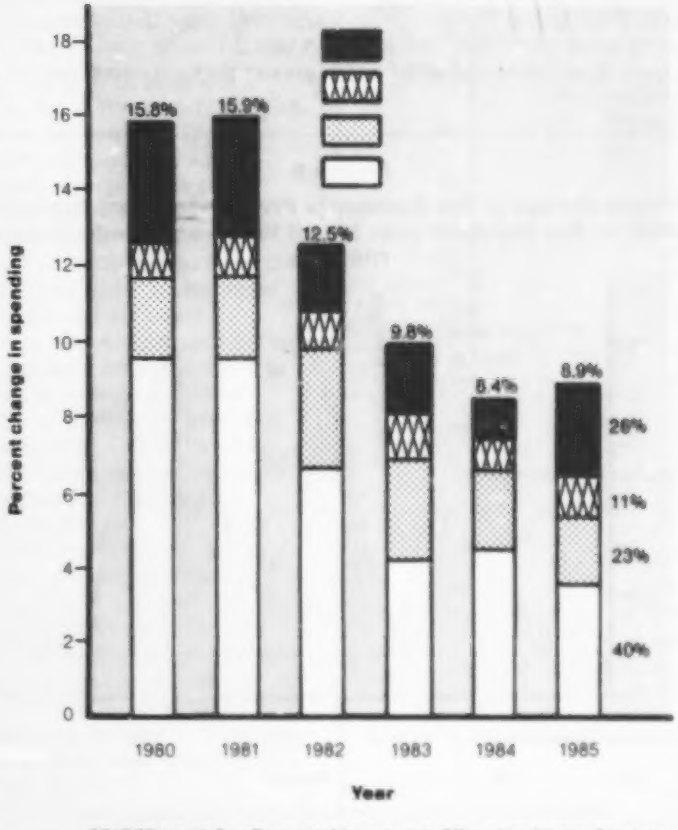
Medical prices typically have grown more rapidly than have consumer prices in general, except during the Economic Stabilization Program in 1972-74 and the mortgage-rate frenzy in 1979-80. The precipitous drop in oil prices experienced in 1986 caused the Consumer Price Index for all items to slow dramatically. However, medical care price inflation began to rise again.

10-year upward trend (Hospital Data Center, 1986). A number of potential explanations for this trend exist. First, the health industry in general has recently become more businesslike in management and decisionmaking in response to cost-containment pressures from insurers and employers alike. Second, hospitals are finding new ways to supplement income from patients. They may do this by entering new enterprises such as freestanding primary care centers. They may also use existing facilities for new purposes. At least one hospital, for example, has begun a commercial flat laundry service to use slack time in its own laundry. Third, large profits have reportedly been made by some types of community hospitals in the first years of Medicare's prospective payment system.

The same pressures that are forcing hospitals to become more businesslike in their operation are also fostering development of alternatives to traditional health care centered around hospitals and family physicians. A new subindustry, the walk-in clinic, has arisen in just a few years. From 150 establishments in 1979, the number of walk-in clinics has grown to 1,850 in 1984, with an annual business of $800 million (Henderson, 1985).

Figure 3

Factors affecting the growth of personal health care expenditures: Calendar years 1980-85



SOURCE: Health Care Financing Administration, Office of the Actuary: Data from the Division of National Cost Estimates.

During the last 5 years, spending for personal health care has grown at diminished rates. In 1985, two-thirds of the growth was attributable to price inflation and another one-quarter to changes in use per capita.

Prepaid health care, usually in the form of a health maintenance organization (HMO), traces its roots back to the Great Depression but did not experience rapid growth until the last decade. In December 1985, 21 million people were enrolled in 480 HMO's across the Nation (InterStudy, 1986). Record-setting enrollment growth, up 25.7 percent from December 1984, laid the groundwork for strong growth in the 1990's, when projections indicate that 25-30 percent of the U.S. population will be enrolled in HMO's.

The appeal of HMO's stems from their ability to manage total patient care by directing patients to and treating them in the appropriate setting (thus reducing hospitalizations), by emphasizing

Foreign health spending

As demonstrated in a study (Schieber, 1985) conducted under the auspices of the Organization for Economic Cooperation and Development (OECD), rising levels of per capita national income are associated with higher proportions of that income being spent on health: a 10-percent increase in gross domestic product (GDP) per capita is associated with a 4.4-percent increase in the share of GDP going for health.

The author found "both a fairly consistent pattern of real growth in health spending relative to GDP within countries and greater than proportional spending differentials in countries with higher GDP's . . . . " He also stated, "Health care price inflation in excess of overall economic inflation continues to be a problem, albeit not the major one, in many, although not all, of the countries. Increases in utilization/intensity of services due to both coverage changes and technological progress, population aging, and large increases in the number of physicians could pose significant new expenditure pressures in most OECD countries in the near future."

preventive care, and by keeping costs low. The average monthly premium per family for HMO enrollees increased only 4 percent in 1985, to $196 (InterStudy, 1986).

Home health care is another response to cost-containment pressures. Although the exact size—indeed, the exact definition—of the industry is the subject of debate, the rapidity of its growth is not. Medicare and Medicaid benefits alone rose from less than $100 million per year in 1972 to $3 billion per year in 1985.

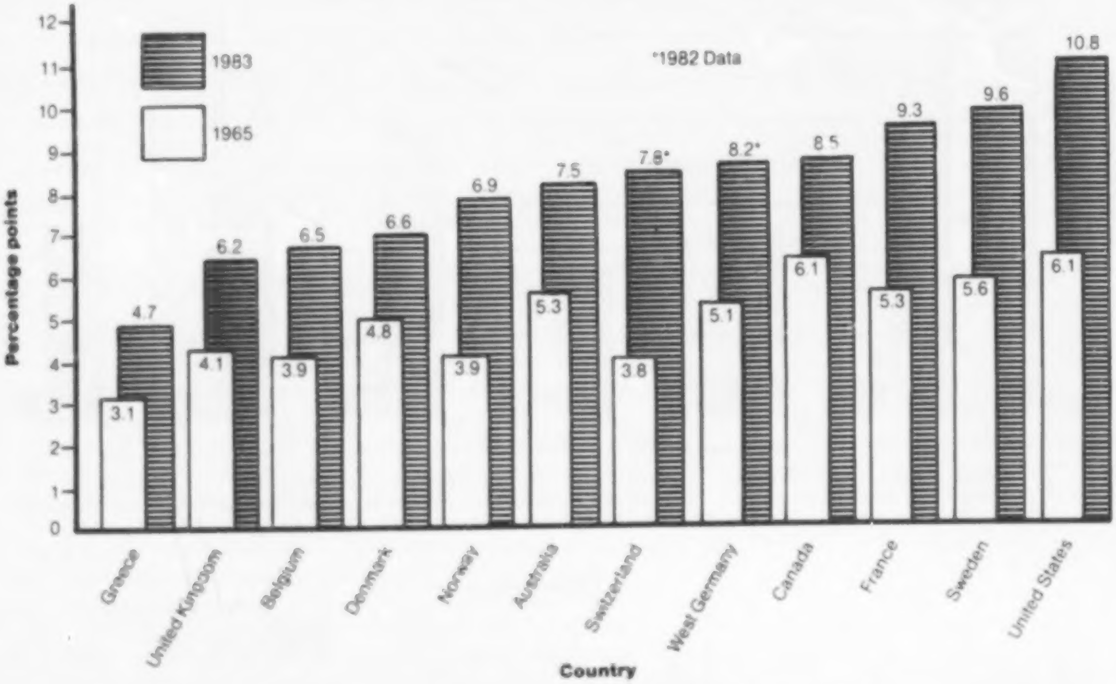
Changes in financing of care

Like other insurers of health care, the Medicare program has been grappling with the rising cost of health care. It has been seeking ways to protect the access to care not only of current beneficiaries, but also of future retirees.

Medicare's hospital insurance (HI), or Part A, trust fund is still in jeopardy despite the implementation of the hospital prospective payment system. In 1985, 30.6 million people 65 years of age or over, disabled, or suffering from end stage renal disease were covered by the hospital portion of Medicare. This number is expected to increase to 43.4 million 25 years from now. The average couple enrolled in HI can expect to receive more in benefits than they paid into the program (for example, from 7 to 26 times as much for a couple retiring in 1985). Therefore, the program depends on taxes paid by future beneficiaries (current workers) to finance care for current beneficiaries. However, changing demographic conditions will create problems. As stated in the most recent Trustee's report: "There are currently over four covered workers supporting each HI enrollee. This ratio will begin to decline rapidly early in the next century. By the middle of that century, there will be only slightly more than two covered workers supporting each enrollee. Not only are the anticipated reserves and financing of the HI program inadequate to offset this demographic change, but under all but the most optimistic assumptions, the HI trust fund is

Figure 4

Total health expenditures as a share of gross domestic product: Selected countries, 1965 and 1983



SOURCE: Health Care Financing Administration, Office of the Actuary: Data from the Division of National Cost Estimates.

In 1983, health spending averaged 7.6 percent of gross domestic product (GDP)—a measure similar to gross national product—in developed countries. The individual nations' experience exhibited considerable fluctuation around that average. The extent to which spending for health has risen as a share of GDP since 1965 is shown.

projected to become exhausted even before the major demographic shift begins to occur. Exhaustion is projected to occur during the late 1990's . . . and could occur as early as 1993 if the pessimistic assumptions are realized" (Health Care Financing Administration, 1986).

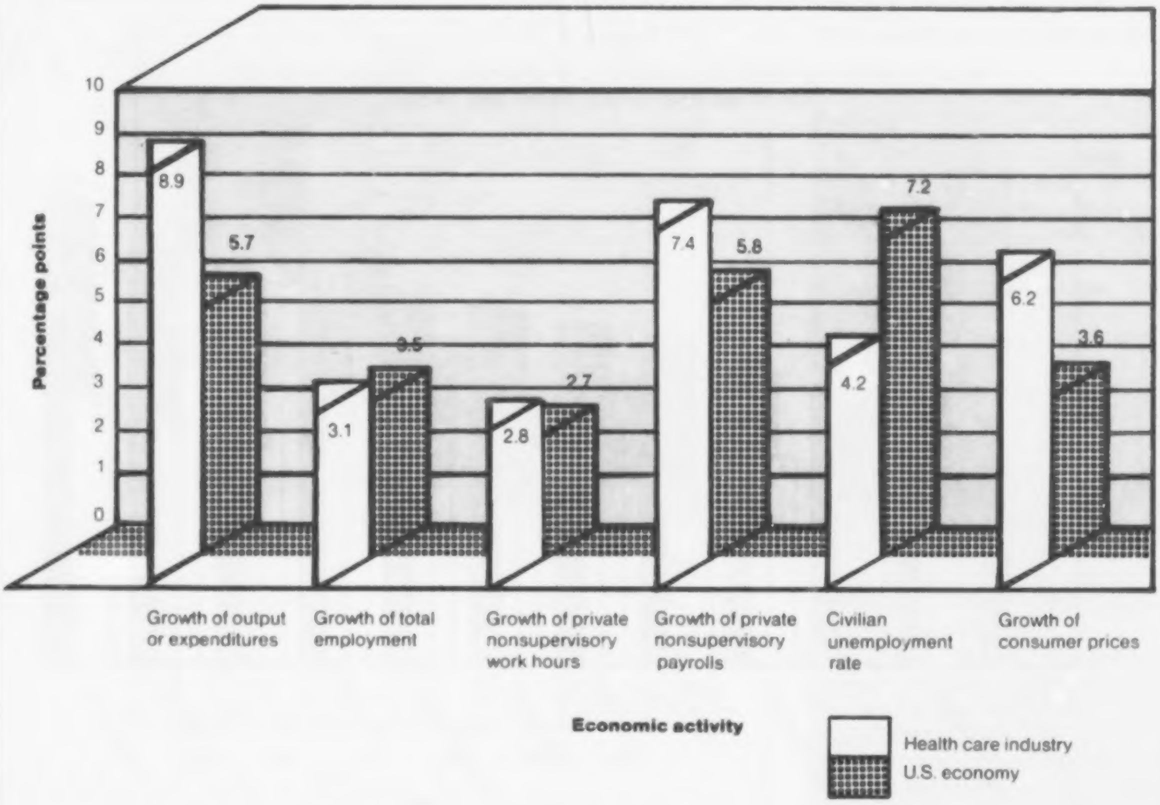
In an effort to extend the life of the HI trust fund, Medicare implemented its prospective payment system (PPS) in stages, beginning in 1983. A primary objective of PPS is to encourage the efficient and effective provision of hospital care by changing the economic incentives of the payment system. PPS controls Medicare payments for inpatient hospital services in about 80 percent of U.S. hospitals and is based on an average cost per case for each of 467 diagnosis-related groups. The year-to-year growth in the payment rates is a composite of price inflation and measures of hospital production.

Medicare's supplementary medical insurance (SMI), or Part B, program is financed through enrollee premiums and general tax revenue. Currently, premiums cover about one-quarter of program costs, so considerable tax revenue, $18 billion in 1985, is needed to provide benefits. In 1985, 30.0 million people, most of whom were 65 years of age or over, were enrolled in Medicare Part B; by 1993, that number should reach 34.3 million. SMI benefits are not currently subject to PPS-type reimbursement. However, research is under way to determine methods of introducing cost consciousness into the way in which Part B care is delivered.

Medicare faces problems in establishing cost controls without jeopardizing quality of care. One proposed solution to these problems is to enroll Medicare beneficiaries in HMO's and

Figure 5

Measures of economic activity in the health care industry and in the overall economy: United States, 1985



SOURCE: Health Care Financing Administration, Office of the Actuary: Data from the Division of National Cost Estimates.

In some respects, the health industry showed more strength than did the overall economy in 1985. Dollar output of the health industry grew faster, as did private earnings. Price inflation also exceeded growth of consumer prices in general. Private employment and hours worked grew at about the same rate as in the private sector in general. The unemployment rate for health workers was lower than in the civilian labor force as a whole.

competitive medical plans (CMP's) on a risk basis. (An HMO or CMP that operates on a risk basis assumes the financial risk of the enrollee's medical care in return for a premium.) Changes in Federal laws regarding reimbursement to HMO's and CMP's, effective February 1985, substantially increased participation in HMO risk enrollment, both by providers and by Medicare enrollees. As of June 1986, 630,000 beneficiaries were enrolled on a risk basis in 132 HMO's and CMP's, 5.8 percent more than in the previous month. (Another 220,000 enrollees were in HMO's reimbursed on a cost basis.) From March 1985 to June 1986, enrollment of Medicare beneficiaries in HMO's operated on a risk basis more than doubled.

The Tax Equity and Fiscal Responsibility Act of February 1985 allowed HMO's to accept Medicare enrollees on a risk basis. This provided incentives for the government, the industry, and enrollees to participate in such prepaid arrangements. The attraction for the government lies in the ability to control expenditures using the forces of the marketplace—competition and consumer choice. Contracting is more attractive to the industry because of the opportunity for profit and the prospective nature of Medicare payments.

The attractiveness of HMO risk contracts to Medicare beneficiaries stems from the additional benefits available. The Medicare program pays a risk HMO 95 percent of the adjusted average per capita cost (AAPCC) of regular Medicare benefits for enrollees in the HMO's geographic area. However, if the commercial rate charged by the HMO (adjusted for Medicare) is less than the AAPCC, the HMO must do one of four things. It may use the difference to reduce premiums, to provide additional benefits, to offset future premium increases, or it may return the difference to the government. The enrollee continues to pay the Medicare Part B premium, but the reduced HMO premium (as low as zero in some HMO's) and additional benefits, such as prescription drug coverage or unlimited hospitalization, can be an attractive alternative to regular fee-for-service Medicare.

Medicaid authorities also are seeking ways to reduce program costs. After increases of more than 15 percent per year from 1978 to 1981, Medicaid expenditure growth has slowed considerably because of changes initiated by State and Federal Governments in the areas of services, reimbursement, and eligibility.

According to an Intergovernmental Health Policy Project report (1986): "How much of the recent slowdown in the growth of Medicaid expenditures can be attributed to new State initiatives and experimentation in the organization, financing, and reimbursement of services, as opposed to reduced Federal financial participation, or Federal and State policies constricting eligibility and benefits, cannot easily be determined. Nevertheless, several State officials have singled out increased program flexibility, especially with respect to institutional reimbursement and new waiver opportunities, as contributing significantly to their ability to constrain the growth in their programs."

Among the newest initiatives are competitive bidding programs for inpatient hospital services, which have been implemented in California, Arizona, and Illinois. In States with low hospital occupancy rates, hospitals are willing to bid competitively for the delivery of Medicaid services. In exchange for reduced rates charged to the Medicaid program, hospitals ensure a larger market share and

Hospital profits under prospective payment system

Despite implementation of the prospective payment system (PPS), Medicare's share of the Nation's hospital bill continues to rise, from 26 percent in 1981 to 29 percent in 1985. In 1985 alone, Medicare expenditures for hospital services rose 10.1 percent, 60 percent faster than the growth in all remaining non-Medicare hospital revenues, which increased 6.2 percent.

The rise in Medicare's share of hospital costs over the past 2 years appears to be inconsistent with the cost-containment aims of PPS. At the same time, persistent claims that PPS had thrust some hospitals into severe financial positions prompted the Office of the Inspector General of the Department of Health and Human Services to investigate the early impact of PPS. The study results indicate that the 2,099 hospitals included in the study earned "a net profit margin of about 15 percent on Medicare revenues and . . . a return on investment of 25 percent" (Kusserow, 1986). The study highlighted the larger profits recorded by teaching hospitals (47 percent higher than their nonteaching counterparts), by investor-owned facilities (21 percent higher than nonprofit facilities), by urban hospitals (74 percent higher than rural facilities), and by hospitals with greater numbers of Medicare-certified beds. Based on this evidence of high profit margins earned by PPS hospitals, the Office of the Inspector General's report cited the proposed freeze on PPS rates in 1986 as "a positive step." The report stated that "these Medicare profits resulted, in part, because established PPS rates were based on overstated hospital inpatient operating costs" (Kusserow, 1986).

The Chief Actuary of the Health Care Financing Administration has a different perspective (King, 1986). During the first year of PPS, total expenditures under Medicare for inpatient hospital services were required by law to remain at the same level under PPS as they would have been under the cost-based reimbursement system. When hospitals responded to the incentives of prospective payment by becoming dramatically more cost efficient, profit rates soared.

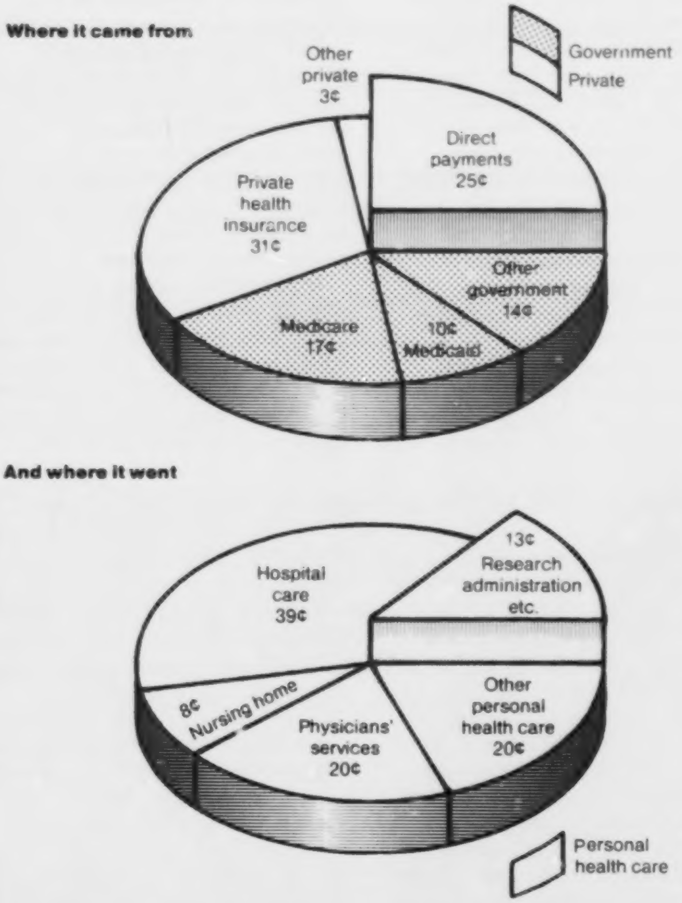
National health expenditures

Following are highlights[1] of 1985 estimates on national health expenditures:

- $425 billion was spent for health in the United States in 1985, an amount equal to 10.7 percent of the gross national product. That figure reflects a commitment of resources equal to $1,721 per person.
- Almost one-half of the money spent for health in 1985 was used to purchase hospital and nursing home services. Hospital expenditures, $167 billion in 1985, grew less during the last 2 years than at any other time in the last two decades.
- $83 billion, 22 percent of personal health care expenditures, were spent for the services of physicians.
- Two-fifths of 1985 health expenditures were made through government programs. This proportion has remained almost unchanged over the last decade despite substantial changes in the size and focus of individual government programs.
- Medicare, the Federal program of health insurance for the aged and disabled, spent $71 billion for health care benefits in 1985, 19 percent of all personal health care expenditures. The proportion of spending attributable to Medicare has increased slowly but steadily since the program's inception in 1966.
- Medicaid, a joint Federal and State program of health care for certain categories of low-income people, paid $40 billion for health care in 1985. The growth of Medicaid spending since 1981 has been much lower than historical growth rates as State governments have grappled with rising health costs and reduced growth of revenues.
- About one-third of health spending was channeled through private health insurance plans. Since 1980, that proportion has remained steady or even fallen a little after years of increase.
- Consumers directly paid 28 percent of personal health care expenditures in 1985. The direct pay percentage declined during the 1960's and 1970's with the growth of government programs and private health insurance coverage, but it appears to have leveled off since 1980.

Figure 6

The Nation's health dollar: 1985



SOURCE: Health Care Financing Administration, Office of the Actuary: Data from the Division of National Cost Estimates.

During 1985, 75 percent of all health expenditures were paid by third parties—government, private health insurance, philanthropy, and business—and 87 percent of the spending went for personal health care.

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[1] An expanded discussion and detailed data are presented in: Lazenby, H., Levit, K. R., and Waldo, D. R.: National health expenditures, 1985. *Health Care Financing Notes*. HCFA Pub. No. 03232. Office of the Actuary, Health Care Financing Administration. Washington. U.S. Government Printing Office, Sept. 1986. A copy may be obtained from: Publications and Information Resources, Room 1A9 Oak Meadows Building, 6325 Security Boulevard, Baltimore, Md. 21207.

increased patient flow through their facilities.

Medicaid also has experimented with HMO's. Enrollment of Medicaid recipients increased substantially over the past year, reaching 561,000 in December 1985, up from 349,000 in June 1984. There are indications, however, that HMO's and Medicaid recipients may not find each other attractive. HMO's find that recipients tend to be high users of services and to have high disenrollment rates (Glenn, 1985b), confounding risk assessment and actuarial ratesetting. For their part, low-income HMO enrollees may need assistance in learning how to use HMO's effectively. The poor may have difficulty securing transportation to single-location medical centers. They may have trouble dealing with the queuing system for appointments and with limitations on emergency room visits. They may lack continuity in care by the same physician or group of physicians and are less likely than others to know how to deal with a medical system that is "predisposed to underserve" (Reichard, 1986).

Employers in the private sector are becoming increasingly aggressive in the pursuit of health care cost containment and are trying a number of paths to this goal (Washington Business Group on Health, 1984). An increasing number are turning to self-insurance in an effort to exert more pressure on providers of care, to benefit from the cash flow advantages of not having to pay premiums, and, in some instances, to avoid State regulation of benefit packages. We estimate that more than one-half of all employees in 1984 were covered by some form of self-insurance, compared with about 10 percent in 1977. The incidence of use review is increasing also as employers, directly or through their insurers, are demanding that uncontrolled use of health care benefits be curtailed.

One development in the area of private sector initiatives is the rise of preferred provider organization (PPO) arrangements. These agreements between providers (groups of physicians, hospitals, and other practitioners) and insurers were originally designed to provide price breaks for the insurer and guaranteed patient loads for the provider. Competition among PPO's, however, has led to variations on that theme: PPO's now offer use review, prepayment options, and other financial and service arrangements (Rice et al., 1985; Cassack, 1985).

All of the forces working on the health care industry have a direct effect on consumers of care as well as providers of care. Congressional hearings have been held to determine whether Medicare's prospective payment system, by creating an incentive for hospitals to discharge patients "quicker and sicker," has caused a deterioration in the health status of the aged population. Health insurance in the aggregate is merely a deferral of payment. The full cost of health care eventually is borne by consumers as a whole in direct costs, higher insurance premiums, higher taxes, or lower wage increases. However, increased coinsurance and deductible requirements present an immediate demand on the individual consumer's pocketbook, a demand that may be difficult to meet if the same illness that requires treatment also reduces income.

Perhaps the most sensitive issue surrounding the effects of current initiatives in health care cost containment is that of indigent care—assuring access to health care for the medically indigent (people with little or no public or private health insurance and without resources to pay for essential services) and assuring the viability of hospitals providing that care. High unemployment has increased the number of people without health insurance coverage. At the same time, public and private health care cost-containment efforts and cutbacks in government spending to aid the indigent have reduced the resources available to finance care for the poor.

Hospitals, affected by these pressures, are seeking ways to control costs and are reluctant to provide care for which they will not be reimbursed. Some hospitals have resorted to economic transfers, "dumping," in which indigent patients, on arrival, are transferred to public or charity hospitals without first receiving emergency treatment or being stabilized. In some cases, the receiving hospital is not aware of

Private cost containment

The National Association of Employers on Health Care recently honored two companies for contributions to health care cost containment. RJR Nabisco, Inc., began operating a prepaid health plan in 1976. It now covers more than 38,000 employees and dependents. In 1978, the company introduced a dental care plan through which employees receive preventive care, endodontia, orthodontia, and oral surgery services. "The company also has implemented other cost-containment measures such as preadmission certification, a preadmission testing requirement, on-site concurrent review in the hospital, and a mandatory second surgical opinion program" (*Business Insurance*, 1986).

The Xerox Corporation, which "moved from a first-dollar medical benefits plan to a comprehensive plan with copayments and deductibles in 1984, has been able to reduce hospital utilization by about 20 percent as a result of cost-containment efforts. . . Xerox also offers employees a comprehensive wellness program, which was established in 1978. The company has fitness facilities at 11 of its major offices, and employee-volunteers who coordinate health seminars, contests, and distribution of wellness materials. Xerox is now in the first stages of developing a managed-care system in which the company will negotiate provider contracts with physicians and hospitals" (*Business Insurance*, 1986).

the transfer until the ambulance arrives at the door, often without any medical records or test results on the patients. Dumping has become so prevalent in some areas that State lawmakers are legislating against it. In addition, recently enacted Federal legislation will require Medicare-certified hospitals to provide treatment to or stabilize all emergency patients before transferring them. Violators risk termination or suspension of the hospital's agreement with Medicare, fines of up to $25,000 per violation on both the hospital and the responsible physician, and civil actions.

Dumping adds to the already heavy workloads in hospitals that provide substantial charity care, and patients are faced with long waits in overcrowded clinics and emergency rooms. Transferred patients in emergency rooms tend to be sicker than nontransferred patients because, in some cases, they delay seeking the preventive medical care they cannot afford. Death rates are higher for transferred patients than for nontransferred patients.

"In the past, hospitals paid for charity care by charging private patients more. Today, the 'Robin Hood' approach to charity care has started to crumble as . . . insurers refuse to pay inflated hospital rates" (Fackelmann, 1986). Some hospitals attempt to shift the cost of indigent care by expanding nonpatient services or establishing luxury hospital suites. " 'The provision of designer health care for the wealthy may enable some hospitals to serve more poor . . . ,' said a report by the Catholic Health Association's task force on health care for the poor" (Fackelmann, 1986).

In 1984, uncompensated care amounted to $9.5 billion, according to industry figures. However, "Not all uncompensated care goes to the poor: About 70 percent is attributable to bad debts. In 1982, investor-owned hospitals classified 97 percent of all uncompensated care as bad debt" (Fackelmann, 1986).

Summary

The health care marketplace in 1985 was a scene of struggle, both among groups and within groups. Although growth of spending slowed, in some cases to 20-year lows, that slowdown was the result of a deceleration of price inflation rather than a fundamental reduction in health care use. The struggle for market share among and between classes of health care providers, the struggle by government to balance social needs with limited resources, and the struggles of providers to resolve the conflict between the ethical and financial aspects of health care all affected the care received by individuals. The industry is in transition, and although transition is healthy, it is not always painless.

Indigent care

Problems associated with financing indigent care in large, inner-city public hospitals are well publicized, but similar problems permeated America's heartlands in the mid-1980's as hard economic times hit farm communities in the Plains States (Baldwin, 1986). Farmers, unable to make a profit on their crops, moved to cut expenses. They canceled health insurance policies, reduced their coverage, or opted for higher deductibles. As a result, hospital uncompensated care in farm States increased, up 55 percent in Kansas from 1982 to 1984 and up almost 14 percent in Iowa from 1982 to 1985.

Two Iowa hospitals met the problem head on. The Des Moines Charter Community Hospital established a fund to finance free care to indigent farmers and convinced area physicians to donate their services at the same time. The Marshalltown Medical and Surgical Center, in conjunction with independent professionals (physicians, dentists, and podiatrists who receive substantially reduced compensation from a church-sponsored fund) created a similar program for farmers in north-central Iowa. Both hospitals' programs avoid the label of "charity care." In neither facility are collections of bills from indigent farmers attempted: one hospital indicates that bills can be paid whenever finances permit; the other simply provides a bill, but does not pursue collection.

Although much uncompensated care is provided in urban areas of farm States, the severity of the problem is felt more acutely in rural hospitals. Small rural facilities with few beds and falling admissions find it difficult to absorb an increase in uncompensated care.

Physician unionization

The impact of the changing structure of the health care industry is vividly illustrated in the physician sector. The number of physicians is growing more rapidly than the population served. Increased competition for patients has forced many physicians, especially new graduates, to consider employment rather than independent practice (Sorian, 1986). High costs of medical education leave most new physicians with substantial debt and little ability to finance the creation of an independent practice. More are turning to employment in hospitals, health maintenance organizations, and other health care groups and institutions.

As employees, some physicians feel they are losing control over the quality of care that they deliver. Pressured by employers and insurers to contain costs, physicians are increasingly concerned that reductions in diagnostic testing and limits on hospitalization may lower the quality of service provided. In addition, the oversupply of physicians in some areas permits employers to hire physicians at relatively low salaries. As a result of these factors, unionization of physicians, although small in numbers, appears to be on the rise.

Home health care

Home health care, as defined in the National Health Accounts, includes preventive, supportive, therapeutic, or rehabilitative medical care provided in a home setting. A broader industry definition includes supportive social services. Regardless of definition, home health care has been an area of rapid growth that shows little indication of slowing.

For patients and their families, home health care may be an attractive substitute for institutional care. Home care services allow patients to remain in their own homes, which may add to the psychological well-being of the patient and involve less cost. Families tend to be relieved of fears and concerns for an absent family member. They also avoid the stress and physical drain caused by repeated visits to an institution that may be some distance away.

Home health care is a small but rapidly growing segment of the health care delivery system, increasing at an estimated average annual rate of 20–25 percent in recent years. According to projections of total industry spending, the cost of home health products and services will grow from $9 billion in 1985 to $16 billion in 1990, with 70 percent of the total going for services (Frost and Sullivan, 1983).

The home health care industry has changed dramatically. From delivery of nursing care by family and friends, through visiting nurse associations, the industry has evolved into a complex health delivery system that involves government; visiting nurse associations; private nonprofit, proprietary, and facility-based providers; and a variety of services. The most significant change in the home health industry has been the emergence of proprietary agencies, particularly chains, as the largest single form of organization. Studies indicate that home health agency (HHA) chains, perceiving home health to be a lucrative market, have been growing rapidly. Corporations controlling the large HHA chains appear to be closely related to other primary health industries, such as pharmaceutical businesses, nursing care facilities, and freelance medical staffing agencies (Williams, Gaumer, and Cella, 1984).

Hospitals are moving into home health care in increasing numbers. In 1984, 42 percent of the Nation's hospitals offered home health services; that fraction was expected to reach 65 percent in 1985 (Glenn, 1985a). HHA's also play an important role in hospitals' efforts to maintain revenues. The hospital home health department's most important function is to serve as a "feeder" for the hospital, identifying potential patients and directing them to the hospital. Hospital-based home health care also allows the hospital, under pressure from the prospective payment system to reduce inpatient cost, to discharge patients yet continue to generate revenue from their care. Home health departments offer a wider base over which to spread overhead costs, and they serve as a marketing tool as well. Further, home health care reduces the hospital's exposure to malpractice suits (Cassak, 1984; Ginzberg, Balinsky, and Ostow, 1984).

A legislative change in 1980 that eased Medicare certification requirements for proprietary HHA's in States without licensure laws opened the way for the rapid growth of proprietary HHA's. The number of certified proprietary HHA's increased fourfold from 1982 to 1985, reaching 1,943 (32 percent of all HHA's).

Despite its rapid growth, there are indications that the home health industry is not keeping up with demand for home health services. Patients are being discharged "quicker and sicker" as a result of hospitals' cost-containment efforts, and home health agencies are scrambling to take care of these new patients. Meanwhile, other patients, those requiring the social-type home health care, are being cut off from services they had come to depend on, such as nutrition and day-care programs (Grady, 1986).

It has been estimated that people 65 years of age or over receive 85–90 percent of the home health care furnished (Ginzberg, Balinsky, and Ostow, 1984; Frost and Sullivan, 1983; Cassak, 1984). Therefore, the aging of the population is an important factor for industry growth. The population 65 years of age or over is projected to increase from 29 million people (or 11.7 percent of the population) in 1985 to 32 million (or 12.4 percent of the population) in 1990 (Social Security Administration, 1986). The average annual rate of growth of the aged population is expected to be 2 1/3 times faster than the rate of growth of the overall population from 1985 to 1990.

Medicare spending for home health care has grown from $60 million in fiscal year 1968 (1.2 percent of total payments for benefits) to $2.3 billion in 1985 (3.3 percent of benefit payments), an annual growth rate of 24 percent. In 1984, 1.5 million Medicare beneficiaries used 40 million home health visits. Visiting nurse associations served the largest number of people, 31 percent, and had the largest number of visits, 12 million. However, proprietary and hospital-based agencies ranked first and second in the percent of total charges billed to Medicare (27 percent and 16 percent, respectively). The share of total HHA charges billed by proprietary agencies almost doubled from 1982 to 1984.

HHA's certified by Medicare are required to submit annual cost reports. A recent analysis of cost reports for 1982 submitted by home health agencies that were not part of a hospital or nursing home indicates that agency costs for services, medical equipment, and supplies provided to Medicare patients represent approximately 50 percent of total agency costs.

Indian Health Service

The rapidly rising cost of health care affects government as well as the private sector. Facing future budget reductions and continuing declines in real per capita expenditures, the Indian Health Service (IHS) is finding ways to meet the needs of its growing constituency.

American Indians and Alaskan Natives living on or near reservations rely predominately on IHS for the health services they require. The needs of these people are great. Unemployment rates are high on many reservations, and one out of every three Indians lives at or below the poverty level. Associated with high unemployment and poverty are death and disease rates that are among the highest in the Nation. The death rate for Indians under 65 years of age is 2 1/2 times as great as that in the general population. Lack of sanitation facilities and safe drinking water make infectious disease a persistent problem, especially in newborns. Death rates from injuries and alcoholism are three and four times the U.S. average, respectively.

Despite Federal appropriations of only $800 million in 1985, IHS maintains a network of 45 hospitals and 137 outpatient facilities. These, along with tribally operated facilities and contract care, provide medical care to 980,000 Indians in the IHS service population. A small budget has not deterred IHS from striving for and achieving substantial success in upgrading the health status of Indians. Among IHS accomplishments recorded in States with reservations are a substantial increase from 1970 to 1980 in life expectancy at birth; a 93-percent decrease in the gastrointestinal death rate from 1955 to 1982; and achievement of a mortality rate for Indian infants during the first 28 days of life that is lower than the U.S. rate.

As both provider and financer of medical care, IHS works to identify prevalent health problems and their causes and to design a cost-effective method for implementing a solution. Lifestyle changes have been promoted. In 1986, most IHS facilities are smoke free. The Zuni Diabetes Project succeeded in introducing a fitness program for diabetics in that tribe, resulting in weight reduction and removal from medication of some of the participants. A patient care information system has been implemented that permits more efficient patient processing and retrieval of patient histories. Studies on ambulatory care delivery allowed IHS to develop a method for optimally allocating health practitioners to outpatient care centers, a method adopted by other Federal agencies.

Sometimes, less traditional methods have been developed for dealing with specific Indian health problems:

"A joint tribal-IHS program has substantially reduced gastroenteritis, a summertime killer of Indian babies. In 1971, the Papago tribal health organization and IHS devised a program that identified infants at high risk and prepared tribal workers to train mothers and to screen infants for the disease. Tribal workers made a presentation in English and O'Odham throughout the reservation that wove local settings and legends with the causes and prevention of gastroenteritis. The outreach workers assessed the stage and severity of the problem in the children whom they saw and, as appropriate, gave mothers dietary advice, administered electrolytes, or made referrals. At summer's end, no Papago baby had died from gastroenteritis, and evaluation of the program revealed that the children whom it had reached had 26 percent fewer outpatient visits and 56 percent fewer hospital days related to that condition. Further analysis determined that education of Papago mothers had had the greatest impact. Gastroenteritis control has subsequently become an annual campaign of the Papago tribe, and the program's design has been applied to upper respiratory infections, unwanted pregnancies, and other health problems" (Indian Health Service, 1986).

Table 1

National health expenditures aggregate, per capita, percent distribution, and average annual percent change, by source of funds: Selected calendar years 1965-85

Item	1985	1984	1983	1982	1981	1980	1975	1970	1967	1965
					Amount in billions					
National health expenditures	$425.0	$390.2	$357.2	$323.6	$287.0	$248.1	$132.7	$75.0	$51.5	$41.9
Private	250.2	230.7	209.7	188.4	165.8	142.9	76.4	47.2	32.5	30.9
Public	174.8	159.5	147.5	135.3	121.2	105.2	56.3	27.8	19.0	11.0
Federal	124.4	111.7	102.7	93.2	83.3	71.0	37.0	17.7	11.9	5.5
State and local	50.4	47.8	44.8	42.1	37.9	34.2	19.3	10.1	7.0	5.5
					Per capita amount					
National health expenditures	$1,721	$1,595	$1,473	$1,348	$1,207	$1,054	$590	$349	$247	$205
Private	1,013	943	865	784	697	607	340	220	156	152
Public	708	652	608	563	510	447	250	129	91	54
Federal	504	456	424	388	350	302	165	82	57	27
State and local	204	195	185	175	159	145	86	47	34	27
					Percent distribution					
National health expenditures	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Private	58.9	59.1	58.7	58.2	57.8	57.6	57.5	63.0	63.2	73.8
Public	41.1	40.9	41.3	41.8	42.2	42.4	42.5	37.0	36.8	26.2
Federal	29.3	28.6	28.8	28.8	29.0	28.6	27.9	23.6	23.2	13.2
State and local	11.9	12.3	12.5	13.0	13.2	13.8	14.5	13.5	13.7	13.0
					Average annual percent change from previous year shown					
U.S. population	0.9	0.9	1.0	1.0	1.0	1.0	0.9	1.0	1.1	—
Gross national product	5.7	11.0	7.4	3.7	11.7	8.9	9.5	7.5	7.6	—
National health expenditures	8.9	9.2	10.4	12.8	15.7	15.6	12.1	13.4	10.8	—
Private	8.5	10.0	11.3	13.6	16.0	15.1	10.1	13.3	2.5	—
Public	9.6	8.1	9.1	11.6	15.2	16.2	15.2	13.6	31.3	—
Federal	11.4	8.7	10.2	11.9	17.3	16.4	16.0	14.0	46.7	—
State and local	5.3	6.8	6.4	11.1	10.9	15.8	13.8	12.8	13.6	—
					Number in millions					
U.S. population[1]	246.9	244.7	242.5	240.2	237.8	235.3	224.9	215.1	208.6	204.1
					Amount in billions					
Gross national product	$3,989	$3,775	$3,402	$3,166	$3,053	$2,732	$1,598	$1,015	$816	$705
					Percent of gross national product					
National health expenditures	10.7	10.3	10.5	10.2	9.4	9.1	8.3	7.4	6.3	5.9

[1] July 1 social security area population estimates.

SOURCE: Health Care Financing Administration, Office of the Actuary: Data from the Division of National Cost Estimates.

Table 2

National health expenditures aggregate and average annual percent change, by type of expenditure: Selected calendar years 1965-85

Type of expenditure	1985	1984	1983	1982	1981	1980	1975	1970	1967	1965
					Amount in billions					
National health expenditures	$425.0	$390.2	$357.2	$323.6	$287.0	$248.1	$132.7	$75.0	$51.5	$41.9
Health services and supplies	409.5	374.5	341.8	309.4	273.8	236.2	124.3	69.6	47.6	38.4
Personal health care	371.4	341.1	314.7	286.5	254.7	219.7	117.1	65.4	44.5	35.9
Hospital care	166.7	155.3	146.8	135.2	119.1	101.6	52.4	28.0	18.4	14.0
Physicians' services	82.8	75.4	68.4	61.8	54.8	46.8	24.9	14.3	10.1	8.5
Dentists' services	27.1	24.6	21.7	19.5	17.3	15.4	8.2	4.7	3.4	2.8
Other professional services	12.6	10.9	9.3	8.0	6.8	5.7	2.6	1.6	1.3	1.0
Drugs and medical sundries	28.5	26.5	24.5	22.1	20.7	18.8	11.9	8.0	5.8	5.2
Eyeglasses and appliances	7.5	7.0	6.2	5.8	5.3	5.1	3.2	1.9	1.3	1.2
Nursing home care	35.2	31.9	29.4	26.7	23.9	20.4	10.1	4.7	2.8	2.1
Other personal health care	11.0	9.4	8.3	7.4	6.8	5.9	3.8	2.1	1.5	1.1
Program administration and net cost of private health insurance	26.2	22.6	17.1	13.5	10.6	9.2	4.0	2.8	2.2	1.7
Government public health activities	11.9	10.9	9.9	9.3	8.5	7.3	3.2	1.4	0.9	0.8
Research and construction of medical facilities	15.4	15.6	15.4	14.3	13.2	11.9	8.4	5.4	3.8	3.5
Noncommercial research[1]	7.4	6.8	6.2	5.9	5.6	5.4	3.3	2.0	1.8	1.5
Construction	8.1	8.9	9.2	8.4	7.6	6.5	5.1	3.4	2.1	2.0
					Average annual percent change from previous year shown					
National health expenditures	8.9	9.2	10.4	12.8	15.7	13.3	12.1	13.4	10.8	—
Health services and supplies	9.3	9.6	10.5	13.0	15.9	13.7	12.3	13.5	11.3	—
Personal health care	8.9	8.4	9.8	12.5	15.9	13.4	12.4	13.7	11.4	—
Hospital care	7.3	5.8	8.6	13.5	17.2	14.2	13.4	15.0	14.7	—
Physicians' services	9.9	10.1	10.7	12.8	16.9	13.4	11.7	12.2	9.4	—
Dentists' services	9.9	13.3	11.6	12.5	12.3	13.3	11.6	12.2	9.4	—
Other professional services	15.2	17.1	17.0	16.9	19.8	16.8	10.4	8.2	10.4	—
Drugs and medical sundries	7.4	8.4	10.6	6.9	10.4	9.4	8.3	11.5	5.5	—
Eyeglasses and appliances	8.3	12.0	6.4	9.4	5.6	9.9	10.1	15.5	3.7	—
Nursing home care	10.6	8.5	9.9	12.0	17.1	15.2	16.4	19.2	15.7	—
Other personal health care	16.0	13.2	13.0	9.2	14.2	9.5	12.8	10.1	16.3	—
Program administration and net cost of private health insurance	16.1	31.7	26.8	27.1	15.9	18.1	7.2	8.0	13.3	—
Government public health activities	9.1	9.6	6.6	10.0	16.3	18.2	17.2	17.2	4.4	—
Research and construction of medical facilities	−1.2	1.6	7.7	8.4	10.3	7.3	9.2	12.1	4.5	—
Noncommercial research[1]	8.9	10.1	4.8	4.6	3.2	10.3	11.1	3.7	7.9	—
Construction	−9.0	−4.1	9.8	11.2	16.3	5.1	8.1	18.4	1.8	—

[1] Research and development expenditures of drug companies and other manufacturers and providers of medical equipment and supplies are excluded from "research expenditures," but they are included in the expenditure class in which the product falls.

SOURCE: Health Care Financing Administration, Office of the Actuary: Data from the Division of National Cost Estimates.

Table 3

National health expenditures, by source of funds and type of expenditure: Calendar years 1980 and 1985

Year and type of expenditure	All sources	Private						Government		
		All private funds	Consumer			Other[1]		Total	Federal	State and local
			Total	Direct	Private insurance					
	Amount in billions									
1985										
National health expenditures	$425.0	$250.2	$238.9	$105.6	$133.3	$11.3		$174.8	$124.4	$50.4
Health services and supplies	409.5	244.3	238.9	105.6	133.3	5.4		165.2	117.2	48.0
Personal health care	371.4	224.0	219.1	105.6	113.5	4.9		147.5	112.6	34.8
Hospital care	166.7	76.9	74.8	15.6	59.3	2.1		89.8	71.6	18.2
Physicians' services	82.8	58.7	58.7	21.8	36.8	0.0		24.1	19.7	4.4
Dentists' services	27.1	26.5	26.5	17.2	9.3	—		0.6	0.3	0.3
Other professional services	12.6	9.0	8.8	6.0	2.8	0.1		3.6	2.8	0.9
Drugs and medical sundries	28.5	25.8	25.8	21.7	4.0	—		2.7	1.4	1.3
Eyeglasses and appliances	7.5	6.1	6.1	5.2	0.9	—		1.5	1.3	0.1
Nursing home care	35.2	18.7	18.4	18.1	0.3	0.3		16.5	9.4	7.1
Other personal health care	11.0	2.3	—	—	—	2.3		8.6	6.0	2.6
Program administration and net cost of private health insurance	26.2	20.4	19.8	—	19.8	0.6		5.8	3.2	2.7
Government public health activities	11.9	—	—	—	—	—		11.9	1.4	10.5
Research and construction of medical facilities	15.4	5.9	—	—	—	5.9		9.6	7.2	2.4
Noncommercial research[2]	7.4	0.4	—	—	—	0.4		7.0	6.4	0.6
Construction	8.1	5.5	—	—	—	5.5		2.6	0.8	1.8
1980										
National health expenditures	248.1	142.9	135.6	63.0	72.6	7.3		105.2	71.0	34.2
Health services and supplies	236.2	138.7	135.6	63.0	72.6	3.0		97.5	65.8	31.7
Personal health care	219.7	133.2	130.5	63.0	67.5	2.7		86.5	62.5	24.0
Hospital care	101.6	47.7	46.6	7.9	38.7	1.1		53.9	41.1	12.8
Physicians' services	46.8	34.2	34.2	14.2	20.0	0.0		12.6	9.6	3.0
Dentists' services	15.4	14.8	14.8	10.1	4.7	—		0.6	0.3	0.3
Other professional services	5.7	4.2	4.2	2.8	1.4	0.1		1.4	1.0	0.4
Drugs and medical sundries	18.8	17.1	17.1	15.0	2.2	—		1.6	0.8	0.8
Eyeglasses and appliances	5.1	4.5	4.5	4.1	0.4	—		0.6	0.5	0.1
Nursing home care	20.4	9.2	9.1	8.9	0.2	0.1		11.2	6.0	5.2
Other personal health care	5.9	1.4	—	—	—	1.4		4.5	3.1	1.4
Program administration and net cost of private health insurance	9.2	5.4	5.1	—	5.1	0.3		3.8	2.0	1.7
Government public health activities	7.3	—	—	—	—	—		7.3	1.3	6.0
Research and construction of medical facilities	11.9	4.3	—	—	—	4.3		7.7	5.2	2.4
Noncommercial research[2]	5.4	0.3	—	—	—	0.3		5.1	4.7	0.5
Construction	6.5	4.0	—	—	—	4.0		2.5	0.6	2.0

[1] Spending by philanthropic organizations, industrial inplant health services, and privately financed construction.

[2] Research and development expenditures of drug companies and other manufacturers and providers of medical equipment and supplies are excluded from "research expenditures," but they are included in the expenditure class in which the product falls.

NOTE: 0.0 denotes less than $50 million.

SOURCE: Health Care Financing Administration, Office of the Actuary: Data from the Division of National Cost Estimates.

Table 4

Personal health care expenditures aggregate, per capita, and percent distribution, by source of funds: Selected calendar years 1965-85

			Third parties							
						Government				
Year	Total	Direct patient payments	All third parties	Private health insurance	Other private funds	Total	Federal	State and local	Medicare[1]	Medicaid[2]
Amount in billions										
1965	$35.9	$18.5	$17.3	$8.7	$0.8	$7.9	$3.6	$4.3	—	—
1970	65.4	26.5	38.9	15.3	1.1	22.4	14.5	7.9	$7.1	$5.2
1975	117.1	38.1	79.0	31.2	1.6	46.3	31.4	14.9	15.6	13.5
1980	219.7	63.0	156.7	67.5	2.7	86.5	62.5	24.0	35.7	25.2
1985	371.4	105.6	265.8	113.5	4.9	147.5	112.6	34.8	70.5	39.8
Per capita amount										
1965	$176	$91	$85	$42	$4	$39	$18	$21	(3)	(3)
1970	304	123	181	71	5	104	68	37	(3)	(3)
1975	521	169	351	139	7	206	140	66	(3)	(3)
1980	934	268	666	287	11	367	266	102	(3)	(3)
1985	1,504	428	1,076	460	20	597	456	141	(3)	(3)
Percent distribution										
1965	100.0	51.6	48.4	24.2	2.2	22.0	10.1	11.9	—	—
1970	100.0	40.5	59.5	23.4	1.7	34.3	22.2	12.1	10.9	8.0
1975	100.0	32.5	67.5	26.7	1.3	39.5	26.8	12.7	13.3	11.6
1980	100.0	28.7	71.3	30.7	1.2	39.4	28.4	10.9	16.2	11.5
1985	100.0	28.4	71.6	30.6	1.3	39.7	30.3	9.4	19.0	10.7

[1] Subset of Federal funds.

[2] Subset of Federal and State and local funds.

[3] Calculation of per capita estimates is inappropriate.

NOTE: Per capita amounts are based on July 1 social security area population estimates.

SOURCE: Health Care Financing Administration, Office of the Actuary: Data from the Division of National Cost Estimates.

Table 5

Hospital care expenditures aggregate, per capita, and percent distribution, by source of funds: Selected calendar years 1965-85

			Third parties							
						Government				
Year	Total	Direct patient payments	All third parties	Private health insurance	Other private funds	Total	Federal	State and local	Medicare[1]	Medicaid[2]
Amount in billions										
1965	$14.0	$2.3	$11.6	$5.7	$0.3	$5.6	$2.4	$3.1	—	—
1970	28.0	3.2	24.8	9.7	0.4	14.7	9.5	5.1	$5.1	$2.2
1975	52.4	4.2	48.2	18.8	0.6	28.9	20.1	8.8	11.5	4.8
1980	101.6	7.9	93.7	38.7	1.1	53.9	41.1	12.8	25.9	9.6
1985	166.7	15.6	151.2	59.3	2.1	89.8	71.6	18.2	48.5	14.8
Per capita amount										
1965	$68	$12	$57	$28	$1	$27	$12	$15	—	—
1970	130	15	115	45	2	68	44	24	(3)	(3)
1975	233	19	215	84	2	128	90	39	(3)	(3)
1980	432	34	398	165	5	229	175	55	(3)	(3)
1985	675	63	612	240	9	364	290	74	(3)	(3)
Percent distribution										
1965	100.0	16.8	83.2	41.1	2.2	39.9	17.4	22.5	—	—
1970	100.0	11.4	88.6	34.6	1.6	52.4	34.1	18.4	18.2	8.0
1975	100.0	7.9	92.1	35.9	1.1	55.1	38.4	16.7	21.9	9.1
1980	100.0	7.8	92.2	38.1	1.1	53.1	40.4	12.6	25.5	9.4
1985	100.0	9.3	90.7	35.6	1.3	53.8	43.0	10.9	29.1	8.9

[1] Subset of Federal funds.

[2] Subset of Federal and State and local funds.

[3] Calculation of per capita estimates is inappropriate.

NOTE: Per capita amounts are based on July 1 social security area population estimates.

SOURCE: Health Care Financing Administration, Office of the Actuary: Data from the Division of National Cost Estimates.

Table 6

Physician care expenditures aggregate, per capita, and percent distribution, by source of funds: Selected calendar years 1965-85

			Third parties							
						Government				
Year	Total	Direct patient payments	All third parties	Private health insurance	Other private funds	Total	Federal	State and local	Medicare[1]	Medicaid[2]
					Amount in billions					
1965	$8.5	$5.2	$3.3	$2.7	$0.0	$0.6	$0.2	$0.4	—	—
1970	14.3	6.5	7.8	4.8	0.0	3.0	2.1	0.9	$1.6	$0.7
1975	24.9	8.5	16.4	9.9	0.0	6.6	4.7	1.9	3.4	1.9
1980	46.8	14.2	32.6	20.0	0.0	12.6	9.6	3.0	7.9	2.4
1985	82.8	21.8	61.0	36.8	0.0	24.1	19.7	4.4	17.1	3.4
					Per capita amount					
1965	$42	$26	$16	$13	$0	$3	$1	$2	—	—
1970	67	30	36	22	0	14	10	4	(3)	(3)
1975	111	38	73	44	0	29	21	8	(3)	(3)
1980	199	61	139	85	0	54	41	13	(3)	(3)
1985	335	88	247	149	0	98	80	18	(3)	(3)
					Percent distribution					
1965	100.0	61.6	38.4	31.4	0.1	6.9	1.8	5.1	—	—
1970	100.0	45.4	54.6	33.6	0.1	20.9	14.9	6.0	11.3	4.8
1975	100.0	34.1	65.9	39.5	0.1	26.3	18.8	7.6	13.5	7.5
1980	100.0	30.4	69.6	42.6	0.1	26.9	20.6	6.3	16.9	5.2
1985	100.0	26.3	73.7	44.5	0.1	29.1	23.8	5.3	20.6	4.1

[1] Subset of Federal funds.

[2] Subset of Federal and State and local funds.

[3] Calculation of per capita estimate is inappropriate.

NOTES: 0.0 denotes less than $50 million for aggregate amounts, and 0 denotes less than $.50 for per capita amounts. Per capita amounts are based on July 1 social security area population estimates.

SOURCE: Health Care Financing Administration, Office of the Actuary: Data from the Division of National Cost Estimates.

Table 7

Nursing home care expenditures aggregate, per capita, and percent distribution, by source of funds: Selected calendar years 1965-85

			Third parties							
						Government				
Year	Total	Direct patient payments	All third parties	Private health insurance	Other private funds	Total	Federal	State and local	Medicare[1]	Medicaid[2]
					Amount in billions					
1965	$2.1	$1.3	$0.7	$0.0	$0.0	$0.7	$0.5	$0.3	—	—
1970	4.7	2.4	2.3	0.0	0.0	2.3	1.3	0.9	$0.3	$1.4
1975	10.1	4.3	5.8	0.1	0.1	5.6	3.2	2.5	0.3	4.8
1980	20.4	8.9	11.5	0.2	0.1	11.2	6.0	5.2	0.4	9.8
1985	35.2	18.1	17.1	0.3	0.3	16.5	9.4	7.1	0.6	14.7
					Per capita amount					
1965	$10	$7	$4	$0	$0	$3	$2	$1	—	—
1970	22	11	11	0	0	11	6	4	(3)	(3)
1975	45	19	26	0	0	25	14	11	(3)	(3)
1980	87	38	49	1	1	48	26	22	(3)	(3)
1985	143	73	69	1	1	67	38	29	(3)	(3)
					Percent distribution					
1965	100.0	64.5	35.5	0.1	1.0	34.3	22.2	12.1	—	—
1970	100.0	50.3	49.7	0.4	0.7	48.6	28.6	20.0	5.6	30.3
1975	100.0	42.7	57.3	0.7	0.6	56.0	31.4	24.6	2.9	47.9
1980	100.0	43.6	56.4	0.9	0.6	54.9	29.6	25.3	1.9	48.0
1985	100.0	51.4	48.6	1.0	0.7	46.9	26.8	20.2	1.7	41.8

[1] Subset of Federal funds.

[2] Subset of Federal and State and local funds.

[3] Calculation of per capita estimates is inappropriate.

NOTES: 0.0 denotes less than $50 million for aggregate amounts, and 0 denotes less than $.50 for per capita amounts. Per capita amounts are based on July 1 social security area population estimates.

SOURCE: Health Care Financing Administration, Office of the Actuary: Data from the Division of National Cost Estimates.

Table 8

Other personal health care expenditures[1] aggregate, per capita, and percent distribution, by source of funds: Selected calendar years 1965-85

			Third parties							
						Government				
Year	Total	Direct patient payments	All third parties	Private health insurance	Other private funds	Total	Federal	State and local	Medicare[2]	Medicaid[3]
					Amount in billions					
1965	$11.3	$9.6	$1.7	$0.3	$0.4	$1.0	$0.6	$0.4	—	—
1970	18.4	14.4	3.9	0.8	0.6	2.5	1.5	1.0	$0.1	$0.9
1975	29.7	21.1	8.6	2.5	0.9	5.2	3.4	1.8	0.4	2.1
1980	50.9	32.0	18.8	8.6	1.5	8.7	5.7	3.0	1.5	3.4
1985	86.7	50.2	36.5	17.0	2.4	17.0	11.9	5.2	4.4	6.8
					Per capita amount					
1965	$56	$47	$8	$1	$2	$5	$3	$2	—	—
1970	85	67	18	4	3	12	7	5	(4)	(4)
1975	132	94	38	11	4	23	15	8	(4)	(4)
1980	216	136	80	37	6	37	24	13	(4)	(4)
1985	351	203	148	69	10	69	48	21	(4)	(4)
					Percent distribution					
1965	100.0	84.7	15.3	2.3	4.0	9.1	5.1	3.9	—	—
1970	100.0	78.6	21.4	4.4	3.3	13.7	8.3	5.4	0.8	4.7
1975	100.0	71.1	28.9	8.4	3.1	17.4	11.5	5.9	1.5	6.9
1980	100.0	63.0	37.0	17.0	2.9	17.2	11.2	5.9	2.9	6.7
1985	100.0	57.9	42.1	19.6	2.8	19.7	13.7	6.0	5.0	7.9

[1] Personal health care expenditures other than those for hospital care, physicians' services, and nursing home care.

[2] Subset of Federal funds.

[3] Subset of Federal and State and local funds.

[4] Calculation of per capita estimates is inappropriate.

NOTE: Per capita amounts are based on July 1 social security area population estimates.

SOURCE: Health Care Financing Administration, Office of the Actuary: Data from the Division of National Cost Estimates.

Table 9

Expenditures for health services and supplies under public programs, by type of expenditure and program: Calendar year 1985

Program area	All expenditures	Personal health care									Administration	Public health activities
		Total	Hospital care	Physicians' services	Dentists' services	Other professional services	Drugs and sundries	Eyeglasses and appliances	Nursing home care	Other		
	Amount in billions											
Public and private spending	$409.5	$371.4	$166.7	$82.8	$27.1	$12.6	$28.5	$7.5	$35.2	$11.0	$26.2	$11.9
All public programs	165.2	147.5	89.8	24.1	0.6	3.6	2.7	1.5	16.5	8.6	5.8	11.9
Federal	117.2	112.6	71.6	19.7	0.3	2.8	1.4	1.3	9.4	6.0	3.2	1.4
State and local	48.0	34.8	18.2	4.4	0.3	0.9	1.3	0.1	7.1	2.6	2.7	10.5
Medicare[1]	72.3	70.5	48.5	17.1	—	2.0	—	1.2	0.6	1.1	1.8	—
Medicaid[2]	41.8	39.8	14.8	3.4	0.5	1.3	2.4	—	14.7	2.7	2.0	—
Federal	23.2	21.9	8.1	1.9	0.3	0.7	1.4	—	8.1	1.5	1.3	—
State and local	18.6	17.9	6.8	1.5	0.2	0.6	1.0	—	6.6	1.2	0.7	—
Other State and local public assistance programs	1.9	1.9	0.9	0.2	0.0	0.0	0.1	—	0.5	0.1	—	—
Veterans' Administration	8.7	8.7	6.9	0.1	0.0	—	0.0	0.1	0.7	0.8	0.1	—
Defense Department[3]	8.4	8.3	6.6	0.3	0.0	—	0.0	—	—	1.4	0.1	—
Workers compensation	8.2	6.3	3.2	2.6	—	0.2	0.1	0.1	—	—	1.9	—
Federal	0.3	0.3	0.2	0.1	—	0.0	0.0	0.0	—	—	0.0	—
State and local	7.9	6.0	3.0	2.6	—	0.2	0.1	0.1	—	—	1.9	—
State and local hospitals[4]	7.3	7.3	7.3	—	—	—	—	—	—	—	—	—
Other public programs for personal health care[5]	4.7	4.6	1.5	0.3	0.0	0.1	0.0	0.1	—	2.5	0.1	—
Federal	2.9	2.9	1.4	0.2	0.0	0.1	0.0	0.0	—	1.2	0.0	—
State and local	1.8	1.7	0.1	0.1	0.0	0.0	0.0	0.0	—	1.4	0.1	—
Government public health activities	11.9	—	—	—	—	—	—	—	—	—	—	11.9
Federal	1.4	—	—	—	—	—	—	—	—	—	—	1.4
State and local	10.5	—	—	—	—	—	—	—	—	—	—	10.5
Medicare and Medicaid[6]	113.5	109.7	63.3	20.4	0.5	3.3	2.4	1.2	15.3	3.3	3.8	—

[1] Total Federal expenditures from trust funds for benefits and administration. Trust fund income includes premium payments paid by or on behalf of enrollees.

[2] Includes funds paid into the Medicare trust funds by States under "buy-in" agreements to cover premiums for public assistance recipients and for people who are medically indigent.

[3] Includes care for retirees and military dependents.

[4] Expenditures not offset by revenues.

[5] Includes program spending for maternal and child health; vocational rehabilitation medical payments; temporary disability insurance medical payments; Public Health Service and other Federal hospitals; Indian health services; alcoholism, drug abuse, and mental health; and school health.

[6] Excludes "buy-in" premiums paid by Medicaid for supplementary medical insurance coverage of aged and disabled Medicaid recipients eligible for coverage.

NOTE: 0.0 denotes less than $50 million.

SOURCE: Health Care Financing Administration, Office of the Actuary: Data from the Division of National Cost Estimates.

Table 10

Personal health care expenditures, by type of expenditure and selected source of funds: Calendar years 1985 and 1980

Source of payment	Total	Hospital care	Physicians' services	Dentists' services	Other professional services	Drugs and sundries	Eyeglasses and appliances	Nursing home care	Other
					Amount in billions				
1985									
Personal health care expenditures	$371.4	$166.7	$82.8	$27.1	$12.6	$28.5	$7.5	$35.2	$11.0
Direct patient payments	105.6	15.6	21.8	17.2	6.0	21.7	5.2	18.1	—
Third-party payments	265.8	151.2	61.0	9.8	6.6	6.7	2.4	17.1	11.0
Private health insurance	113.5	59.3	36.8	9.3	2.8	4.0	0.9	0.3	—
Philanthropy and industrial inplant	4.9	2.1	0.0	—	0.1	—	—	0.3	2.3
Government	147.5	89.8	24.1	0.6	3.6	2.7	1.5	16.5	8.6
Federal	112.6	71.6	19.7	0.3	2.8	1.4	1.3	9.4	6.0
Medicare	70.5	48.5	17.1	—	2.0	—	1.2	0.6	1.1
Medicaid	21.9	8.1	1.9	0.3	0.7	1.4	—	8.1	1.5
Other	20.2	15.0	0.7	0.0	0.1	0.1	0.1	0.7	3.4
State and local	34.8	18.2	4.4	0.3	0.9	1.3	0.1	7.1	2.6
Medicaid	17.9	6.8	1.5	0.2	0.6	1.0	—	6.6	1.2
Other	17.0	11.4	2.9	0.0	0.2	0.3	0.1	0.5	1.4
1980									
Personal health care expenditures	219.7	101.6	46.8	15.4	5.7	18.8	5.1	20.4	5.9
Direct patient payments	63.0	7.9	14.2	10.1	2.8	15.0	4.1	8.9	—
Third-party payments	156.7	93.7	32.6	5.3	2.9	3.8	0.9	11.5	5.9
Private health insurance	67.5	38.7	20.0	4.7	1.4	2.2	0.4	0.2	—
Philanthropy and industrial inplant	2.7	1.1	0.0	—	0.1	—	—	0.1	1.4
Government	86.5	53.9	12.6	0.6	1.4	1.6	0.6	11.2	4.5
Federal	62.5	41.1	9.6	0.3	1.0	0.8	0.5	6.0	3.1
Medicare	35.7	25.9	7.9	—	0.7	—	0.4	0.4	0.4
Medicaid	13.6	5.2	1.3	0.3	0.3	0.8	—	5.3	0.5
Other	13.1	10.0	0.4	0.1	0.0	0.0	0.1	0.4	2.1
State and local	24.0	12.8	3.0	0.3	0.4	0.8	0.1	5.2	1.4
Medicaid	11.6	4.4	1.1	0.2	0.3	0.6	—	4.5	0.4
Other	12.4	8.4	1.9	0.0	0.2	0.2	0.1	0.7	1.0

NOTES: 0.0 denotes less than $50 million. Medicaid expenditures include Part B premium payments to Medicare by States under "buy-in" agreements to cover premiums for eligible Medicaid recipients.

SOURCE: Health Care Financing Administration, Office of the Actuary: Data from the Division of National Cost Estimates.

Table 11

Payments into Medicare trust funds and percent distribution, by type of fund and source of income: Fiscal years 1971 and 1985

Year and source of income	Total		Hospital insurance trust fund		Supplementary medical insurance trust fund	
	Amount in billions	Percent distribution	Amount in billions	Percent distribution	Amount in billions	Percent distribution
1985						
Total	$75.5	100.0	$50.9	100.0	$24.6	100.0
Payroll taxes	46.9	62.1	46.9	92.0	—	—
General revenues	18.8	24.8	0.9	1.7	17.9	72.8
Premiums	5.6	7.4	0.0	0.1	5.5	22.5
Interest	4.3	5.7	3.2	6.2	1.2	4.7
1971						
Total	8.5	100.0	6.0	100.0	2.5	100.0
Payroll taxes	5.0	58.2	5.0	82.5	—	—
General revenues	2.1	24.8	0.9	14.5	1.2	49.5
Premiums	1.3	14.7	—	—	1.3	49.8
Interest	0.2	2.3	0.2	3.0	0.0	0.7

NOTE: 0.0 denotes less than $50 million.

SOURCE: Health Care Financing Administration, Office of the Actuary: Data from the Division of National Cost Estimates.

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Outcomes of surgery in the Medicare aged population: Rehospitalization after surgery

by Gerald Riley and James Lubitz

Using 1979 and 1980 data, rehospitalization rates following eight common surgical procedures are examined for aged Medicare beneficiaries. Rehospitalization rates within 30 days after discharge from the surgical stay varied considerably among procedures and were higher for older beneficiaries. Patients residing in the Northeast had the lowest rates of rehospitalization, although their rehospitalizations tended to be lengthier than those elsewhere. Rehospitalization rates were also tracked for 9 months following discharge from the surgical stay. For all procedures, rehospitalization rates decreased during the 9 months after discharge, but they remained above the prevailing hospitalization rate for the Medicare aged population for the entire 9 months. Principal diagnoses associated with rehospitalizations within 30 days were often related to the body system on which surgery was initially performed, suggesting that many rehospitalizations are for continuing problems related to the initial condition that necessitated surgery.

Rehospitalization rates presented in this article will serve as baseline data for monitoring trends under Medicare's prospective payment system for hospitals.

Introduction and background

Presented in this article are findings from the third study of outcomes for several common surgical procedures performed on aged Medicare beneficiaries. In the first study, post-surgical mortality rates in the hospital and up to 12 months following surgery were examined (Lubitz, Riley, and Newton, 1985). Age- and sex-specific mortality rates were presented, as well as mortality rates by census region. It was found that mortality rates for several procedures were significantly lower in the West; it was also found that nationally mortality for some procedures was above the prevailing rate for the Medicare aged population for up to a year after surgery. In the second study, the relationship between mortality and surgical volume in individual hospitals was examined (Riley and Lubitz, 1985). From that study, it was concluded that for some procedures lower mortality rates were associated with increased surgical volume. In this article, based on the third study, we look at rehospitalizations (also referred to as readmissions) following the same set of procedures studied previously.

Rehospitalization after surgery is an important aspect of the overall patterns of care provided to surgical patients. Readmission to the hospital can occur for treatment of a variety of conditions, including post-surgical complications, comorbid conditions, and the effects of nosocomial infections or other problems related to the initial hospital stay. Readmission may also be necessary to perform additional procedures that the patient was unable to undergo during the initial stay. Of course, the reason for readmission may also be unrelated to the original surgery. To the extent that readmissions are related to avoidable complications arising from the initial surgical stay, readmissions are a measure of post-surgical outcome.

Variations and trends in patterns of rehospitalization can also provide insights into underlying uncertainties in medical practice, as well as into responses to financial incentives facing physicians and hospitals. In particular, patterns of rehospitalization among aged Medicare surgical patients are of interest now because of the implementation of prospective payment to hospitals under Medicare. Prospective payment is expected to produce financial incentives that may radically change patterns of hospitalization, including readmissions. For example, hospitals have an incentive to discharge patients as early as possible because the hospital receives a fixed amount regardless of the length of stay of a particular case. This may result in some patients being discharged prematurely, with a subsequent need to return to the hospital. It has been anticipated that hospitals may "unbundle" services under prospective payment, i.e., admit a patient twice to perform two procedures that normally could be performed during one stay. To date, there has been no evidence of an increase in hospital admissions under prospective payment, however (Health Care Financing Administration, 1985).

Rehospitalizations are of general interest because patients experiencing multiple admissions account for a large portion of hospital expenditures (Anderson and Steinberg, 1984; Zook et al., 1980). Anderson and Steinberg (1984) estimated that, between 1974 and 1977, 24 percent of Medicare inpatient hospital expenditures were attributable to readmissions that occurred within 60 days after a discharge. They also found that readmission rates within 60 days after discharge did not vary with age among beneficiaries over 65 years of age, and that the probability of readmission was higher for males, beneficiaries living

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in rural areas, Medicaid-eligible beneficiaries, and beneficiaries undergoing surgery.

Guralnick and Resnic (1974) investigated multiple short-stay hospitalizations among Medicare beneficiaries in 1967. They found that one-fourth of all hospitalized persons were discharged from a short-stay hospital more than once in the year, and that 46 percent of discharges were attributable to those persons hospitalized more than once. They also found that the probability of multiple hospitalizations was higher for males than for females, and that the risk of multiple hospitalizations, given that one hospitalization had already occurred, rose with age, though the rise was slight.

Gornick (1977) described the rehospitalization experience of a sample of discharged patients in 1972-73, including both medical and surgical discharges. She found that a large number of readmissions occurred within 21 days after discharge (24.7 percent of readmissions during 1972-73 occurred within 21 days after a prior discharge), and that a significant number occurred on the same day as discharge (3.6 percent of readmissions). She also found considerable regional variation in hospitalization rates, and she noted that States with high hospitalization rates also had high rates of multiple hospitalizations. Regional rates of rehospitalization following selected procedures are provided in this article.

Characteristics (age and sex) of the beneficiaries who experience rehospitalization following specific kinds of surgery and the types of diganoses and procedures associated with their subsequent stays will be described here. Patterns of rehospitalization for aged Medicare beneficiaries who have undergone the following surgical procedures were examined in this study:

- Transurethral prostatectomy (TUR).
    - Those with a principal diagnosis of cancer.
    - Those with a principal diagnosis other than cancer.
- Cholecystectomy.
- Repair of inguinal hernia.
- Coronary artery bypass.
- Reduction of fracture of the femur.[1]
- Total hip replacement.
- Other arthroplasty of the hip.

These procedures were selected for the study because (with the exception of coronary artery bypass) they are among the most frequently performed on the aged. In 1980, hospital discharges for these operations comprised 14 percent of the 3.1 million total surgical discharges among the 26.5 million aged persons in the United States enrolled under Part A (Hospital Insurance) of Medicare.

Rehospitalization rates are contrasted for different age and sex groups and regions of the country. Rehospitalization data are also provided for various time periods following the surgical stay.

Data and methods

The data sources for this study are the 1979, 1980, and 1981 Medicare provider analysis and review (MEDPAR) files, which are part of the Medicare Statistical System of the Health Care Financing Administration. The annual MEDPAR files contain information on discharges from short-stay hospitals for a 20-percent probability sample of Medicare beneficiaries selected on the basis of their Medicare identification numbers. The information includes demographic data (e.g., age and sex), hospital data (e.g., size and location), and information about the stay (e.g., principal surgical procedure, principal diagnosis, and whether the patient died in the hospital). In 1979-81, the principal surgical procedure and principal diagnosis were coded for each discharge using the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM).

The hospital discharge is the unit of analysis for this study. Discharges of aged beneficiaries occurring in 1979 and 1980 with the appropriate ICD-9-CM procedure codes were selected and pooled across both years. Information on up to four subsequent hospitalizations within a year of surgery was obtained from the MEDPAR file and appended to the record for the index case. If an individual underwent more than one hospitalization for study procedures during 1979-80, each discharge was included as a separate observation. Cases with a principal diagnosis of cancer for the stay in which the study procedure was performed were excluded from the sample because there were very few patients with a principal diagnosis of cancer, and it was assumed that rehospitalization rates for cancer patients would be determined to a large extent by their disease and would be less influenced by their operations per se. Cancer patients were included among the transurethral prostatectomy patients, however, because of their larger numbers (17 percent of all TUR discharges); and they are reported separately in the tables. This group will be referred to as prostatectomy (TUR-CA) in the text.

All rehospitalizations were included in the analysis, regardless of the reason for them. In the case of total hip replacement, this means that some of the rehospitalizations included in the tables are for replacement of the second hip. Among total hip replacement patients, 5 percent of the rehospitalizations occurring within 30 days after discharge had another total hip replacement recorded as the principal surgical procedure on the MEDPAR bill.

An important potential limitation of the data concerns the reliability of diagnostic and procedure data in the Medicare Statistical System. The Institute of Medicine (IOM) (1979) compared diagnostic and surgical information on the Medicare record with that obtained by a trained field team that reabstracted hospital records for a sample of Medicare patients. Discrepancies were found for many diagnoses and procedures. There was a discrepancy between the IOM abstract and the Medicare record regarding the procedure in 21 percent of the cases reviewed. The 21-percent disagreement rate included disagreements about whether or not a procedure was performed and also about the nature of the principal procedure. In 43 percent of the cases in which Medicare records indicated a procedure was performed, there was a disagreement between the Medicare record and the IOM record on what the correct code was. Most of the discrepancies were caused by incomplete narrative information on the claim form from which codes were assigned.

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[1] Although the surgical codes contained in the *International Classification of Diseases, 9th Revision, Clinical Modification* (ICD-9-CM) do not identify the specific part of the femur that is fractured, the majority of breaks for elderly patients occur at the neck of the femur. In this study, over 90 percent of patients with a principal diagnosis of a fractured femur had a fracture of the neck of the femur.

Other errors included routine misuse of the coding system and the improper designation of one of several procedures as the principal one. Some types of errors might result in some undercounting of certain procedures but would not invalidate the information obtained for those cases identified for our study. Others are undoubtedly minor in nature and would not affect the study (e.g., most errors affecting only the fourth digit of the surgical code). The IOM study did not reveal any errors that would appear to systematically bias our study results.

Because the study data constitute a 20-percent sample of discharges for selected procedures, there is sampling error associated with the estimates presented in the tables. (Estimated standard errors for selected tables are available from the authors on request.)

Results

National estimates of the annual number of noncancer-related live discharges for the study procedures are given in Table 1, along with an estimate of cancer-related prostatectomies (TUR-CA). It should be noted that these estimates are probably somewhat low because prior to 1983 only the principal surgical procedure was coded for each inpatient bill. Of the study procedures, prostatectomy (TUR) accounted for the most discharges, with an overall average of 142,930 annually, followed by cholecystectomy (87,614) and inguinal hernia repair (84,090). Coronary artery bypass was the least common of this group of procedures (15,093 annually). The average annual numbers of discharges per 10,000 aged enrollees in 1979-80 for these procedures have been published (Lubitz, Riley, and Newton, 1985).

Because the focus of this article is rehospitalization following surgery, only surgical stays from which the patient was discharged alive were included in Table 1 and in subsequent tables. This is the population considered "at risk" for rehospitalization. The

Table 1

Average annual number of live discharges among aged Medicare enrollees for selected procedures, age, and sex: 1979-80

Procedure and sex	ICD-9-CM[1] code(s)	All ages	65-74 years	75-84 years	85 years or over
			Number of discharges		
Prostatectomy	60.2	142,930	78,267	52,300	12,363
Cancer diagnosis		24,698	11,385	10,488	2,825
Noncancer diagnosis		118,232	66,882	41,812	9,538
Cholecystectomy	51.2	87,614	55,745	26,326	5,543
Male		30,906	20,240	9,018	1,648
Female		56,708	35,505	17,308	3,895
Inguinal hernia repair	53.0, 53.1	84,090	51,840	26,825	5,425
Male		73,932	46,842	22,865	4,225
Female		10,158	4,998	3,960	1,200
Coronary artery bypass	36.1	15,093	13,582	1,483	28
Male		10,665	9,642	1,015	8
Female		4,428	3,940	468	20
Reduction, fracture of femur	79.05, 79.15, 79.25, 79.35	49,689	12,234	21,543	15,912
Male		10,347	3,422	4,345	2,580
Female		39,342	8,812	17,198	13,332
Total hip replacement	81.5	25,175	14,810	8,785	1,580
Male		8,617	5,632	2,655	330
Female		16,558	9,178	6,130	1,250
Other arthroplasty of hip	81.6	43,914	12,727	19,390	11,797
Male		9,134	3,422	3,690	2,022
Female		34,780	9,305	15,700	9,775

[1] *International Classification of Diseases, 9th Revision, Clinical Modification.*

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare Statistical System, 1979-81.

Table 2

Percent of patients discharged alive for selected procedures, 1979-80

Procedure	Percent discharged alive
Prostatectomy (cancer diagnosis)	98.6
Prostatectomy (noncancer diagnosis)	99.1
Cholecystectomy	97.5
Inguinal hernia repair	99.5
Coronary artery bypass	95.3
Reduction, fracture of femur	95.0
Total hip replacement	98.8
Other arthroplasty of hip	95.8

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare Statistical System, 1979-81.

Table 3

Number of Medicare surgical patients rehospitalized per 10,000 live discharges on the day of discharge, within 7 days, and within 30 days for selected procedures: 1979-80

Procedure	Same day as discharge	Within 7 days	Within 30 days
	Number rehospitalized per 10,000 live discharges		
Prostatectomy (Cancer diagnosis)	63	466	1,379
Prostatectomy (Noncancer diagnosis)	52	409	1,071
Cholecystectomy	59	328	806
Inguinal hernia repair	25	177	508
Coronary artery bypass	204	727	1,633
Reduction, fracture of femur	300	535	1,178
Total hip replacement	126	367	838
Other arthroplasty of hip	269	556	1,187

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare Statistical System, 1979-81.

percent of all patients undergoing the study procedures in 1979-80 who were discharged alive are shown in Table 2.

Patients undergoing reduction of fracture of the femur, coronary artery bypass, and other arthroplasty of the hip had inhospital mortality rates of 4 to 5 percent, whereas patients in the other study categories had death rates of 0.5 to 2.5 percent.

During the period 1979-80, the number of patients undergoing one or more rehospitalizations within 30 days after discharge, per 10,000 live discharges, was highest for coronary artery bypass, at 1,633 per 10,000 (Table 3). This finding is consistent with the fact that, among these eight procedure groups, coronary artery bypass patients exhibited many of the highest age- and sex-specific mortality rates within 1.5 months following surgery (Lubitz, Riley, and Newton, 1985). Rehospitalization rates were also high for patients undergoing prostatectomy (TUR-CA) (1,379 readmitted per 10,000 discharges), other arthroplasty of the hip (1,187 readmitted per 10,000 discharges), and reduction of fracture of the femur (1,178 per 10,000). Patients undergoing the latter two procedures also exhibited high rates of mortality following surgery (750 deaths per 10,000 procedures and 878 deaths per 10,000, respectively, in the 1.5 months following surgery). The lowest rates of rehospitalization were experienced by patients undergoing repair of inguinal hernia (508 per 10,000), who also had low mortality rates. It is interesting to note that prostatectomy (TUR) patients had higher rates of rehospitalization (1,071 per 10,000) than did cholecystectomy patients (806 per 10,000), although the number of deaths per 10,000 for cholecystectomy patients substantially exceeded those for prostatectomy (TUR) patients (372 and 214 within 1.5 months following surgery, respectively).

The data in columns 2 and 3 of Table 3 can be used to show that of all patients reentering a hospital within 30 days after discharge, between 34 and 47 percent (depending on the initial procedure) were readmitted within a week following surgical discharge. This indicates that a significant portion of readmissions occur within a very short time after discharge. The relative frequencies of readmission within 7 days after discharge were similar to those for readmissions within 30 days after discharge; the difference is that prostatectomy (TUR-CA) exhibited the fourth highest readmission rate within 7 days after discharge and the second highest rate within 30 days after discharge. Some surgical patients were rehospitalized on the same day as discharge from the surgical stay. These figures include patients who were transferred from one short-stay hospital to another. Transfers to long-term hospitals are not included in the table because the MEDPAR file includes discharges from short-stay hospitals only.

The same-day readmission rate varied somewhat more among procedures than did the rehospitalization rates within 7 and 30 days. Patients undergoing reduction of fracture of the femur and other arthroplasty of the hip had the highest same-day readmission rates of 300 and 269 per 10,000, respectively. Patients undergoing inguinal hernia repair, prostatectomy (TUR), and cholecystectomy had same-day readmission rates of only 25, 52, and 59 per 10,000, respectively. The high rates of same-day rehospitalization for reduction of fracture of the femur and other arthroplasty of the hip patients may reflect transfers to rehabilitation hospitals for recovery following repair of a fractured hip. Data in columns 1 and 3 of Table 3 indicate that patients undergoing immediate readmission as a percent of all patients undergoing readmission within 30 days after discharge varied from 5 percent (prostatectomy, both CA and other, and inguinal hernia repair) to 25 percent (reduction of fracture of the femur).

Several patterns are evident in the rehospitalization data with respect to age and sex (Table 4). For reduction, fracture of femur, and other arthroplasty of hip rehospitalization rates differed little by age. For prostatectomy (TUR-CA) rates were lowest for patients 75-84 years of age. For all other procedures, rehospitalization rates increased with age (e.g., for

Table 4

Number of Medicare surgical patients rehospitalized per 10,000 live discharges, within 30 days of discharge, for selected procedures, by age and sex: 1979-80

Procedure and sex	All ages	65-74 years	75-84 years	85 years or over
	Number rehospitalized per 10,000 live discharges			
Prostatectomy (Cancer diagnosis)	1,379	1,456	1,240	1,584
Prostatectomy (Noncancer diagnosis)	1,071	951	1,156	1,536
Cholecystectomy	806	681	969	1,286
Male	930	804	1,114	1,472
Female	738	611	893	1,207
Inguinal hernia repair	508	408	627	876
Male	510	409	639	923
Female	495	390	562	708
Coronary artery bypass	1,633	1,557	2,310	(1)
Male	1,481	1,400	2,217	(1)
Female	1,999	1,942	2,513	(1)
Reduction, fracture of femur	1,178	1,093	1,198	1,218
Male	1,418	1,286	1,387	1,647
Female	1,115	1,018	1,150	1,134
Total hip replacement	838	726	939	1,329
Male	830	697	998	1,742
Female	843	744	914	1,220
Other arthroplasty of hip	1,187	1,090	1,209	1,255
Male	1,505	1,205	1,680	1,693
Female	1,103	1,048	1,099	1,164

[1] Data on coronary artery bypass for enrollees 85 years of age or over are excluded because of the small number of procedures.

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare Statistical System, 1979-81.

cholecystectomy, the rates were 89 percent higher for those 85 years of age or over than for those 65–74 years of age). This differs from the findings of Anderson and Steinberg (1984), who found no difference in readmission rates within 60 days following discharge by age. Their analyses included both medical and surgical stays, however. Substantial differences by sex are also evident in Table 4. Females tended to be rehospitalized less frequently than males in the 30 days following discharge, with the exception of all coronary artery bypass patients and total hip replacement patients 65–74 years of age, where rates for females were higher. For example, among cholecystectomy patients, males were readmitted 26 percent more often than females.

Regional comparisons

The rehospitalization experience of the beneficiaries undergoing the study procedures often varied significantly by region (Table 5). The table provides information on the number of persons rehospitalized per 10,000 live discharges and on the number of hospital days associated with readmissions occurring within 30 days after discharge, per 10,000 live discharges. The latter measure is included in the table to take recognition of the fact that, although certain regions (notably the Northeast) tended to have low readmission rates, their average lengths of stay tended to be long, and therefore the number of hospital days associated with readmission tends to be high. The regional rates presented in the table are age and sex standardized to the U.S. sample population by the direct method. This means that the standardized regional rates represent what the overall regional rates would have been if each region had the Nation's age and sex distribution of patients, given the age- and sex-specific rates observed in each region. Statistically significant differences in regional rates were identified by making six pairwise comparisons among the regions for each procedure (testing for differences in proportions for the rehospitalization rates and using t-tests for number of days) and applying an $\alpha = .0083$ (or $.05 \div 6$) level of significance.

For five of the eight procedures, significant regional differences were observed in the number of patients rehospitalized per 10,000 live discharges. Significant regional differences were also identified for four procedures with respect to the number of days associated with readmissions occurring within 30 days after discharge, per 10,000 live discharges. In particular, patients in the Northeast had the lowest rehospitalization rate among the four regions for seven of the eight procedures. The difference between the rehospitalization rate for the Northeast and that for one or more of the other regions was statistically significant for five procedures. The Northeast had the highest number of days associated with readmissions within 30 days for five of the eight procedures, however, because of its longer average length of stay. Conversely, the West had the lowest number of days associated with rehospitalization for seven of the eight procedures because of its short length of stay (the difference between the West and at least one other region was significant for four procedures). The South and North Central Regions tended to have the highest rehospitalization rates, accounting for the two highest readmission rates out of the four regions for six of the procedures. The South had particularly high rates of rehospitalization for cholecystectomy, reduction of fracture of the femur, and other arthroplasty of the hip, with rehospitalization rates that were significantly higher than those for each of the other three regions. Unadjusted State-specific rehospitalization rates are available from the authors upon request.

The regional patterns in rehospitalization rates described above agree closely with regional patterns of hospitalization found by Gornick (1977). She found that in 1972 the Northeast had the lowest discharge rate per 1,000 enrollees (261.0) and the South the highest (328.6). We examined the relationship between hospitalization rates and rehospitalization rates on an

Table 5

Number of Medicare surgical patients rehospitalized per 10,000 live discharges, within 30 days of discharge, and the average number of hospital days associated with all readmissions occurring within 30 days, for selected procedures, by region: 1979-80

Procedure	United States	Region				Significant regional differences[1]
		North East	North Central	South	West	
Prostatectomy (Cancer diagnosis)						
Number rehospitalized	1,379	1,338	1,420	1,437	1,263	No
Number of days	15,440	17,340	16,720	14,880	11,790	Yes
Prostatectomy (Noncancer diagnosis)						
Number rehospitalized	1,071	1,012	1,118	1,100	1,017	Yes
Number of days	11,380	12,740	11,830	11,190	9,500	Yes
Cholecystectomy						
Number rehospitalized	806	701	775	914	772	Yes
Number of days	9,860	9,910	9,780	10,920	7,720	Yes
Inguinal hernia repair						
Number rehospitalized	508	495	522	513	495	No
Number of days	5,660	6,550	6,370	5,230	4,100	Yes
Coronary artery bypass						
Number rehospitalized	1,633	1,391	1,727	1,721	1,563	No
Number of days	19,340	19,660	20,610	19,320	17,350	No
Reduction, fracture of femur						
Number rehospitalized	1,178	1,057	1,108	1,371	1,077	Yes
Number of days	21,620	24,000	20,910	22,390	18,490	No
Total hip replacement						
Number rehospitalized	838	721	765	939	955	Yes
Number of days	13,560	16,320	11,150	16,080	12,060	No
Other arthroplasty of hip						
Number rehospitalized	1,187	876	1,120	1,397	1,179	Yes
Number of days	20,670	20,530	19,100	22,800	18,830	No

[1] 1 or more pairwise differences significant at the .05 ÷ 6 = .0083 level.

NOTE: Age and sex adjusted to the U.S. sample by the direct method.

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare Statistical System, 1979-81.

operation-specific basis for our set of study procedures. This was done by computing a Spearman's rank correlation coefficient for regional hospitalization and readmission rates, adjusted for age and sex differences among regions. Hospitalization rates were computed as numbers of specific procedures per 10,000 aged Medicare enrollees. In order to make hospitalization and readmission rates comparable across procedures, each procedure-specific regional rate was first divided by the U.S. rate for that procedure. This was done for both hospitalization and readmission rates. The regional rates, divided by the U.S. rates, were then pooled across the eight procedures, yielding 32 pairs of hospitalization and readmission data. The correlation coefficient for these data was .40, which was significant at the .05 level. Therefore, in regions where beneficiaries tended to undergo relatively large numbers of certain procedures, they also tended to be rehospitalized more often following these procedures.

Length of surgical stay

Readmission rates may be expected to vary with differences in the length of stay of the hospitalizations in which the surgeries were performed. Patients with longer than average length of stay often have complications or comorbid conditions that require additional treatment and may also lead to subsequent readmission. Patterns in rehospitalization rates by length of preceding stay are of particular interest at this time because, under prospective payment, there may be a financial incentive to discharge patients that exceed average lengths of stay if such patients are perceived as being a source of unreimbursed expenses. It is also possible that patients with very short lengths of stay may frequently need to return to the hospital.

Age- and sex-adjusted rehospitalization rates by quartile of the length of the surgical stay are given in Table 6. The adjusted rates represent what the rehospitalization rate would have been in each quartile if all quartiles had the same age and sex distribution as the average of all patients undergoing the particular procedure. For each procedure, the rates of readmission varied directly with the length of the original surgical stay. For patients undergoing cholecystectomy and inguinal hernia repair, the range in readmission rates was largest. Readmission rates for inguinal hernia repair patients in the lowest

Table 6

Number of persons rehospitalized per 10,000 live discharges, within 30 days of discharge (excluding transfers) for selected procedures, by length of original surgical stay: 1979-80

Procedure	Total	Length of stay 1st quartile	2nd quartile	3rd quartile	4th quartile
	Number rehospitalized per 10,000 live discharges				
Prostatectomy (Cancer diagnosis)	1,324	1,104	1,178	1,383	1,678
Prostatectomy (Noncancer diagnosis)	1,024	788	814	1,081	1,421
Cholecystectomy	752	419	579	836	1,171
Inguinal hernia repair	484	284	331	492	910
Coronary artery bypass	1,459	1,187	1,225	1,636	1,815
Reduction, fracture of femur	906	827	825	946	1,072
Total hip replacement	721	506	709	687	1,008
Other arthroplasty of hip	943	801	865	930	1,229

NOTE: Rehospitalization rates are age and sex adjusted to the total sample using the direct method.

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare Statistical System, 1979-81.

Table 7

Number of patients rehospitalized per 10,000 live discharges, within 30 days of discharge for selected procedures, by hospital location: 1979-80

Procedure[1]	Total	SMSA	Non-SMSA
	Number rehospitalized per 10,000 live discharges		
Prostatectomy (Cancer diagnosis)	1,379	1,319	1,596
Prostatectomy (Noncancer diagnosis)	1,071	1,039	1,188
Cholecystectomy	806	761	930
Inguinal hernia repair	508	483	574
Reduction, fracture of femur	1,178	1,125	1,359
Total hip replacement	838	831	871
Other arthroplasty of hip	1,187	1,141	1,353

[1] Coronary artery bypass is not included in the table because there are too few observations in non-SMSA areas.

NOTE: SMSA is standard metropolitan statistical area. Rehospitalization rates for SMSA and non-SMSA areas are age and sex adjusted to the total sample using the direct method.

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare Statistical System, 1979-81.

quartile with respect to length of surgical stay were only 31 percent of the readmission rates for patients in the highest quartile; readmission rates for cholecystectomy patients in the lowest quartile were 36 percent of those for patients in the highest quartile. Readmission rates did not vary as strongly with length of stay for patients undergoing reduction of fracture of the femur. Readmission rates were nearly identical for the two lowest quartiles of length of stay, and patients in the lowest quartile had readmission rates 77 percent of those for patients in the highest quartile.

Comparison of hospitals by location

Patients undergoing surgery in hospitals located in standard metropolitan statistical areas (SMSA's) were readmitted to a hospital within 30 days after discharge less often (after adjusting for age and sex differences) than those undergoing surgery in non-SMSA hospitals (Table 7). For all procedures except total hip replacement, patients undergoing operations in SMSA hospitals were rehospitalized between 82 and 87 percent as often as patients undergoing operations in non-SMSA hospitals. For total hip replacement patients, readmission rates were similar for those undergoing operations in SMSA and non-SMSA hospitals. Anderson and Steinberg (1984) found higher readmission rates within 60 days after discharge for beneficiaries residing in rural areas. These differences may be the result of several factors. Small rural hospitals may frequently transfer more complicated cases to urban tertiary care hospitals. Some sophisticated equipment and facilities maintained in physicians' offices and clinics in urban areas may be available only in hospitals in rural areas, necessitating some readmissions for followup care. Case mix may also differ among geographic areas.

The differences in rehospitalization rates between SMSA and non-SMSA areas may be related to the regional differences noted earlier. The Northeast, which exhibited the lowest readmission rates, had the lowest percent of patients residing in non-SMSA areas for most procedures, with the West exhibiting a similar concentration of patients in SMSA areas (data not shown)[2]. The North Central and South, which had the highest rates of rehospitalization, also had the highest percents of patients residing in non-SMSA areas.

Patterns through time

Patients who undergo the study procedures tend to have higher than average hospitalization rates for several months following discharge (Table 8). Data in Table 8 provide the ratio of all observed hospitalizations to those expected if the sample patients experienced the prevailing hospitalization patterns of the Medicare aged population in total. (This ratio will be referred to as the hospitalization ratio.) The expected hospitalization experience is estimated by dividing total Medicare discharges for 1980 by the 1980 mid-year enrollment, then prorating by 30 or 90 days. The expected numbers of hospitalizations per 10,000 aged enrollees for a 30-day period by age and sex are available from the authors.

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[2] We are considering the percent of patients residing in non-SMSA areas to be a proxy for the number undergoing operations in non-SMSA hospitals for the purpose of comparing regions.

Although observed hospitalization rates for the sample patients are being compared with the prevailing hospitalization rate in the Medicare aged population, it should not be inferred that post-surgical patients are truly "expected" to experience prevailing hospitalization patterns shortly after surgery. Surgical patients sometimes have poor underlying health (particulary nonelective cases), and any surgery-related complications may lead to additional hospitalizations. Consequently, data in Table 8 are not intended to measure excessive or unnecessary hospitalizations, but they are presented as a descriptive measure that puts post-surgical hospitalization patterns into clearer perspective.

Table 8

Ratio of actual-to-expected number of readmissions for various time periods after surgical discharge for selected procedures: 1979-80

Procedure	Months after discharge 1	2	3	4-6	7-9
			Ratio		
Prostatectomy (Cancer diagnosis)	4.42	3.20	3.16	2.92	2.47
Prostatectomy (Noncancer diagnosis)	3.58	2.01	1.86	1.63	1.53
Cholecystectomy	3.01	1.99	1.69	1.54	1.45
Inguinal hernia repair	1.72	1.34	1.21	1.17	1.14
Coronary artery bypass	6.67	3.05	2.42	1.89	1.67
Reduction, fracture of femur	3.75	2.15	1.86	1.53	1.42
Total hip replacement	3.07	1.73	1.79	1.45	1.38
Other arthroplasty of hip	3.87	1.96	1.71	1.47	1.41

NOTES: Expected number of readmissions is based on the age- and sex-specific rates of the entire Medicare aged population applied to the populations of patients undergoing the individual procedures. All ratios are significantly above 1.00 at the .05 level.

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare Statistical System, 1979-81.

Coronary artery bypass patients had the highest hospitalization ratio in the first month following discharge (6.67), although prostatectomy (TUR-CA) patients had the highest hospitalization ratios in the following months (e.g., 2.47 in months 7–9). Hospitalization ratios were relatively high for all groups of patients in the first month following discharge, decreased substantially in the second month, and continued to decrease slowly after that. These ratios remained significantly above 1 for the entire 9-month period following discharge for all eight study procedures, even though the mortality experience for some categories of patients returned to normal well before then (Lubitz, Riley, and Newton, 1985).

The percent of patients with multiple rehospitalizations within 6 months after discharge is given in Table 9. Prostatectomy (TUR-CA) patients tended to undergo multiple rehospitalizations more often than other patients (15.3 percent underwent two or more rehospitalizations within 6 months after discharge). Coronary artery bypass patients tended to undergo multiple hospitalizations with the second highest frequency (10.2 percent underwent two or more rehospitalizations). Inguinal hernia repair patients exhibited the lowest multiple rehospitalization rate (only 4.6 percent underwent two or more rehospitalizations).

Rehospitalization: Conditions and procedures

The most common conditions for which study patients were rehospitalized within 30 days after discharge are listed in Table 10. Not surprisingly, the most common reasons for rehospitalization usually involved the same body systems that were involved in the original surgery. For example, over one-half of the rehospitalizations attributable to coronary artery bypass patients involved diseases of the circulatory system, as measured by the principal diagnosis listed on the Medicare record. This represented 973 rehospitalizations per 10,000 live discharges for coronary artery bypass patients. Similarly, 29 percent

Table 9

Percent distribution of Medicare patients for selected procedures, by number of readmissions within 6 months of discharge: 1979-80

Procedure	Total discharges	No readmissions	1 readmission	2 readmissions	3 readmissions	4 or more readmissions
			Percent distribution			
Prostatectomy (Cancer diagnosis)	100.0	57.3	27.5	10.1	3.3	1.9
Prostatectomy (Noncancer diagnosis)	100.0	71.6	20.1	5.8	1.8	0.7
Cholecystectomy	100.0	77.3	16.2	4.4	1.5	0.6
Inguinal hernia repair	100.0	81.7	13.7	3.4	0.9	0.3
Coronary artery bypass	100.0	66.8	22.9	7.0	2.1	1.1
Reduction, fracture of femur	100.0	70.6	22.2	5.5	1.2	0.6
Total hip replacement	100.0	76.2	18.1	4.3	1.0	0.5
Other arthroplasty of hip	100.0	72.0	21.1	5.3	1.2	0.5

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare Statistical System, 1979-81.

Table 10

Five most common groups of principal diagnoses associated with rehospitalizations occurring within 30 days of surgical discharge for selected procedures: 1979-80

Procedure	Principal diagnoses of rehospitalization and ICD-9-CM codes[1]	Number rehospitalized per 10,000 live discharges	Percent of rehospitalizations occurring within 30 days
Prostatectomy (Cancer diagnosis)	Neoplasms (140-239)	685	44.8
	Diseases of the circulatory system (390-459)	217	14.2
	Diseases of the genitourinary system (580-629)	176	11.5
	Symptoms, signs, and ill-defined conditions (780-799)	113	7.4
	Complications of surgical and medical care, not elsewhere classified (996-999)	94	6.2
Prostatectomy (Noncancer diagnosis)	Diseases of the genitourinary system (580-629)	300	25.3
	Diseases of the circulatory system (390-459)	227	19.2
	Complications of surgical and medical care, not elsewhere classified (996-999)	134	11.3
	Symptoms, signs, and ill-defined conditions (780-799)	128	10.8
	Neoplasms (140-239)	88	7.4
Cholecystectomy	Diseases of the digestive system (520-579)	251	28.9
	Diseases of the circulatory system (390-459)	176	20.3
	Symptoms, signs, and ill-defined conditions (780-799)	100	11.5
	Diseases of the genitourinary system (580-629)	61	7.0
	Diseases of the respiratory system (460-519)	55	6.3
Inguinal hernia repair	Diseases of the circulatory system (390-459)	121	22.1
	Diseases of the genitourinary system (580-629)	94	17.3
	Diseases of the digestive system (520-579)	98	18.0
	Symptoms, signs, and ill-defined conditions (780-799)	51	9.4
	Neoplasms (140-239)	46	8.3
Coronary artery bypass	Diseases of the circulatory system (390-459)	973	53.4
	Symptoms, signs, and ill-defined conditions (780-799)	207	11.4
	Diseases of the digestive system (520-579)	121	6.7
	Complications of surgical and medical care, not elsewhere classified (996-999)	95	5.2
	Diseases of the respiratory system (460-519)	87	4.7
Reduction, fracture of femur	Fractures (800-829)	287	22.7
	Diseases of the circulatory system (390-459)	246	19.5
	Symptoms, signs, and ill-defined conditions (780-799)	118	9.4
	Diseases of the respiratory system (460-519)	104	8.2
	Diseases of the digestive system (520-579)	83	6.5
Total hip replacement	Diseases of the circulatory system (390-459)	184	20.5
	Diseases of the musculoskeletal system and connective tissue (701-739)	127	14.2
	Symptoms, signs, and ill-defined conditions (780-799)	80	9.0
	Complications of surgical and medical care, not elsewhere classified (996-999)	74	8.2
	Diseases of the digestive system (520-579)	66	7.3
Other arthroplasty of the hip	Diseases of the circulatory system (390-459)	233	18.3
	Fractures (800-829)	205	16.1
	Symptoms, signs, and ill-defined conditions (780-799)	135	10.6
	Diseases of the respiratory system (460-519)	100	7.8
	Diseases of the digestive system (520-579)	79	6.2

[1] *International Classification of Diseases, 9th Revision, Clinical Modification.*

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare Statistical System, 1979-81.

of rehospitalizations following cholecystectomy involved diseases of the digestive system, and 25 percent of those following prostatectomy (TUR) involved diseases of the genitourinary system. Fractures were common reasons for rehospitalizations following reduction of fracture of the femur (23 percent) and other arthroplasty of the hip (16 percent). In addition, 45 percent of rehospitalizations following prostatectomy (TUR-CA) were for treatment of neoplasms. This indicates that for many patients the condition that necessitated the original surgery, or a related problem, was associated with followup hospitalization. For patients undergoing prostatectomy (TUR-CA), prostatectomy (TUR), total hip replacement, and coronary artery bypass, complications of surgical and medical care were fairly common reasons for readmission, accounting for 6, 11, 8, and 5 percent of rehospitalizations, respectively. Symptoms, signs, and ill-defined conditions were also

Table 11

Three most common groups of principal procedures associated with rehospitalizations occurring within 30 days after surgical discharge, for selected procedure: 1979-80

Procedure	Principal diagnoses of rehospitalization and ICD-9-CM codes[1]	Number of rehospitalizations per 10,000 live discharges	Percent of all rehospitalizations occurring within 30 days
Prostatectomy (Cancer diagnosis)	Operations on male genital organs (60-64)	[2]163	10.7
	Operations on the urinary system (55-59)	[2]129	8.4
	Operations on the digestive system (42-54)	[2]49	3.2
Prostatectomy (Noncancer diagnosis)	Operations on the urinary system (55-59)	[2]83	7.0
	Operations on male genital organs (60-64)	[2]58	4.9
	Operations on the digestive system (42-54)	[2]57	4.8
Cholecystectomy	Operations on the digestive system (42-54)	81	9.4
	Operations on male genital organs (60-64)	[2]50	2.0
	Operations on the urinary system (55-59)	16	1.8
Inguinal hernia repair	Operations on the digestive system (42-54)	69	12.3
	Operations on male genital organs (60-64)	[2]63	10.1
	Operations on the urinary system (55-59)	21	3.8
Coronary artery bypass	Operations on cardiovascular system (35-39)	88	4.8
	Operations on the digestive system (42-54)	40	2.2
	Operations on the musculoskeletal system (76-84)	24	1.3
Reduction, fracture of femur	Operations on the musculoskeletal system (76-84)	116	9.2
	Operations on the digestive system (42-54)	34	2.7
	Unspecified procedures (HCFA code 00.60)	24	1.9
Total hip replacement	Operations on the musculoskeletal system (76-84)	169	18.8
	Operations on the digestive system (42-54)	29	3.2
	Unspecified procedures (HCFA code 00.60)	25	2.8
Other arthroplasty of the hip	Operations on the musculoskeletal system (76-84)	140	11.0
	Operations on the digestive system (42-54)	34	2.6
	Unspecified procedures (HCFA code 00.60)	28	2.2

[1] International Classification of Diseases, 9th Revision, Clinical Modification.
[2] Rate given per 10,000 live male discharges.

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare Statistical System, 1979-81.

a common reason for rehospitalization following all procedures.

The most common surgical procedures performed during rehospitalizations within 30 days after discharge are summarized in Table 11. For each of the eight procedures studied, the most common followup procedures performed during rehospitalization involved the same body system as the original operation did. For example, total hip replacement patients underwent 169 operations on the musculoskeletal system per 10,000 live discharges, accounting for 19 percent of all readmissions within 30 days. Prostatectomy (TUR) patients underwent 141 operations on the urinary system or on the genital organs per 10,000 live discharges, accounting for 12 percent of all readmissions. This suggests that patients undergoing the types of surgery included in this study often receive followup surgical treatment for the underlying condition that necessitated the original surgery or for a related problem.

Discussion and conclusions

Rehospitalization following surgery is an important measure of patient outcomes. It is often an indication of complications related to the surgery or of continued care for the condition that necessitated the surgery. Although rehospitalization rates are not as easily interpretable as mortality or direct measures of morbidity, they can provide significant insights into outcomes and patterns of treatment.

The number of surgical patients rehospitalized within 30 days after discharge per 10,000 discharges was high for some procedures. Among coronary artery bypass patients, 16 percent were rehospitalized within a month; 12 percent of other arthroplasty of hip and reduction of fracture of the femur patients were also rehospitalized within a month. These procedures also ranked high on post-surgical mortality rates (Lubitz, Riley, and Newton, 1985).

The most frequent principal diagnoses associated with readmission suggest that many patients are rehospitalized for the same problem (or a related problem) as that which prompted them to undergo surgery in the first place. For example, prostatectomy (TUR) patients were most frequently rehospitalized for diseases of the genitourinary system, cholecystectomy patients for diseases of the digestive system, prostatectomy (TUR-CA) patients for neoplasms, and reduction of fracture of the femur patients for fractures. Complications of surgical and medical care was also a fairly common reason for readmission for patients undergoing prostatectomy (TUR), coronary artery bypass, total hip replacement, and prostatectomy (TUR-CA).

Strong regional differences exist in the incidence of readmissions that tend to mirror regional patterns in the hospitalization rates for these procedures. In particular, the Northeast Region usually had the lowest rates of readmission with the South and North Central Regions often exhibiting the highest. The fact that similar regional patterns in hospitalization rates were found in this study, as well as in earlier ones, suggests that the same factors that produce regional variation in overall hospitalization also apply to readmission following surgery. Such variation may be related to differences in physician training, practice styles, case mix, or other factors. The regional differences in rehospitalization rates may be related to the fact that readmissions were found to be less frequent when the operation was performed in a hospital located in an SMSA. The Northeast and West had the lowest proportion of patients residing in non-SMSA's, and the North Central and South had substantially higher proportions of such patients. We also noted that, because of differences in average length of stay, the average number of hospital days associated with readmission occurring within 30 days after discharge per 10,000 live discharges was lowest in the West and very high in the Northeast.

It is interesting to note that hospitalization rates after surgery remained higher than the rates for the Medicare population in general for at least 9 months following discharge for all eight procedures, although the first article in this series showed that mortality rates for some categories of patients returned to normal levels shortly after surgery. It is a well-known fact that, for Medicare beneficiaries, past use of health care services, including hospital services, is positively correlated with subsequent use of services (Beebe, Lubitz, and Eggers, 1984; Eggers, 1982; Anderson, Resnic, English et al., 1982; McCall and Wai, 1983). Regarding the high level of hospital use of our study patients following surgery, we do not know whether their underlying health was worse than that of the Medicare population at large, whether they continued to suffer complications related to their surgery, or whether they were more inclined to use hospital services for other reasons. For example, they may have regular physicians who tend to prescribe higher than average amounts of hospital care.

The readmission patterns reported here will serve as baseline information for evaluation of the impact of prospective payment on Medicare beneficiaries and program costs. For example, changes in readmission rates could have strong cost implications. Readmissions data can also provide indirect information on the effects of changes in quality of care. Conclusions about quality of care cannot be made solely on the basis of readmission data, however, and must take account of the limitations in readmissions as a patient outcome measure.

Rehospitalization rates often tended to be considerably higher for patients with a lengthy surgical stay. This is a potentially important group of patients to monitor for changes in readmission rates because of possible institutional pressures to discharge these patients prematurely. Too early discharge for patients suffering complications could lead to subsequent hospitalization for the same condition. Preliminary data indicate that reductions in average length of stay between 1981 and 1984 have occurred throughout the distribution of stays, however, and do not appear to have been concentrated on the longer stays (Helbing, 1985). Incentives under the prospective payment system could conceivably change the nature of the relationship between rehospitalization rates and the length of surgical stay. For example, if many patients in the lower quartile were discharged prematurely, then one may begin to see an inverse relationship between rehospitalization and length of surgical stay.

Peer Review Organizations (PRO's) will have an important role in assessing the appropriateness of readmissions under prospective payment. Under their contracts, PRO's will review all readmissions (to either the same or other hospitals) occurring within 7 days after discharge. As part of its review, the PRO will make a determination as to whether the patient was discharged prematurely, and it will submit a report to the appropriate HCFA regional office on each premature discharge. The fact that high rates of readmission persist for months after surgical discharge suggests that consideration should be given to extending PRO review time beyond 7 days after discharge. PRO's will also review the medical appropriateness of all transfers to other hospitals and to skilled nursing facilities (SNF's), including distinct-part SNF's associated with the transferring hospital.

Roos, Cageorge, Austen et al. (1985) have demonstrated that diagnostic information taken from claims data can be used to identify surgical complications that result in readmissions. Using Health Services Commission data from Manitoba, they developed computerized algorithms for identifying complications following prostatectomy, cholecystectomy, and hysterectomy that exhibited high rates of sensitivity and specificity. Roos et al. pointed out that such algorithms can be used to inexpensively monitor surgical outcomes and assess quality of care. They mentioned that such algorithms may be particularly useful to PRO's. Bunker and Fowles (1985) have pointed out that using a computer-based audit to judge quality of care by individual physicians and hospitals may be problematic because of deficiencies in the data available. For example, Medicare claims data prior to 1984 contain only the principal diagnosis associated with the hospitalization and have been shown to contain a substantial number of errors (Institute of Medicine, 1979).

A model for predicting the probability of readmission within 60 days after hospital discharge has been developed for the aged Medicare population by Anderson and Steinberg (1985). They found that the probability of readmission was related to several clinical and demographic characteristics of the patient as well as to the size and location (urban vs. rural) of the discharging hospital. They suggest that this model can be applied by PRO's to identify hospitals with high readmission rates not attributable to case mix.

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Case-mix reimbursement for nursing home services: Simulation approach

by E. Kathleen Adams and Robert E. Schlenker

Nursing home reimbursement based on case mix is a matter of growing interest. Several States either use or are considering this reimbursement method. In this article, we present a method for evaluating key outcomes of such a change for Connecticut nursing homes. A simulation model is used to replicate payments under the case-mix systems used in Maryland, Ohio, and West Virginia. The findings indicate that, compared with the system presently used in Connecticut, these systems would better relate dollar payments to measure patient need, and for-profit homes would benefit relative to nonprofit homes. The Ohio methodology would impose the most additional costs, the West Virginia system would actually be somewhat less expensive in terms of direct patient care payments.

Introduction

One of the most difficult problems in health care reimbursement policy is adjusting payments to patients' care needs, or case mix. In hospital reimbursement, Medicare's answer has been prospective payment per case based on diagnosis-related groups. In nursing home reimbursement, however, the States have taken the lead in adjusting for case mix. The Federal Government is currently considering the use of case-mix reimbursement for skilled nursing facility services provided to Medicare beneficiaries (Jablonski, 1985). Meanwhile, several State governments have already implemented such systems for Medicaid: Illinois (1969), West Virginia (1976), Ohio (1980), and Maryland (1983). In Minnesota, a recently developed method for paying facilities in relation to patient case mix began in fall 1985. In New York, an extensive effort has been made to categorize patients in terms of their relative needs and resource usage, and since January 1, 1986, Medicaid reimbursement to nursing facilities has been based on these categories.

Several advantages can result from case-mix reimbursement systems. Such systems directly relate dollars paid to resident needs and functional disabilities and/or to services deemed necessary to meet these needs. State governments can then be better assured that their payments are in line with patients' clinical needs. Case-mix reimbursement systems can also improve the overall access of Medicaid patients to needed care, particularly for patients with relatively high needs. Improved access may be especially valuable for States with patients "backed up" in hospitals, unable to obtain necessary care. If designed to provide the correct incentives, these reimbursement systems can also encourage the provision of the appropriate type and quality of care while saving State governments the cost of lengthy hospitalization for high-need patients.

Case-mix reimbursement systems also have potential weaknesses. The systems are administratively complex, and nursing homes may be encouraged to keep patients debilitated in order to maintain high payment levels (Smits, 1984). In addition, such systems are ultimately limited in the extent to which the true needs of individual patients can be measured through standardized assessment forms. State governments considering the adoption of a case-mix system should therefore carefully evaluate both the strengths and weaknesses of these systems before proceeding. In this article, we provide an example of such an evaluation for the State of Connecticut.

The Connecticut State government currently has a prospective, facility-specific, cost-based reimbursement system for Medicaid; private pay rates are also regulated under this system. Connecticut policymakers, however, are considering the development of a case-mix reimbursement system for nursing home care as an alternative. As part of that process, the Connecticut government contracted with the Center for Health Services Research, University of Colorado Health Sciences Center, to conduct a simulation study of the implications for Connecticut of adopting a system similar to those used in three other States: Ohio, West Virginia, and Maryland. The study was carried out for the Connecticut Department of Income Maintenance (which administers the Medicaid program) and the Medicaid Cost Containment Study Commission (a legislative study group). The study is summarized here; a complete discussion can be found in the final report (Adams et al., 1985).

The simulation model used in this analysis was drawn from a larger model under development as part of a study funded by the Health Care Financing

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The study reported in this article was funded by the Connecticut Department of Income Maintenance and was carried out for that department and for the Connecticut Medicaid Cost Containment Study Commission. The initial and ongoing development of the model used in this study is part of a longer term project, An Analysis of Long-Term Care Payment Systems, funded by the Health Care Financing Administration (HCFA) Cooperative Agreement No. 18-C-98306/8-03. The preparation of this manuscript, in particular, was made possible by HCFA funding. However, the conclusions presented are the authors' and should not be attributed to any of the above agencies.

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Administration (HCFA). For the Connecticut study, the portion of the model that simulates the nursing care component of the nursing home reimbursement rate was applied to data from a representative sample of 26 Connecticut nursing homes and 601 patients. To our knowledge, this is the first such attempt to simulate these case-mix systems using a common data instrument and data base.

The results of the simulation process pertain to the Connecticut nursing home industry, but they should also be of considerable interest to policymakers in other States and at the national level. These results indicate that all three systems would relate Medicaid payments more closely to facility case-mix measures than does the current Connecticut system. They also indicate that Ohio's system would be more costly than Connecticut's current system, West Virginia's would be somewhat less expensive, and Maryland's only slightly more expensive.

Another major finding is that each of the three simulated systems would redistribute Medicaid revenues from the nonprofit to the for-profit facilities in Connecticut. The redistribution under each of these three systems that "account" for differences in case mix among facilities would apparently be attributable to differences in services provided and/or costs incurred. Even under a case-mix system that would provide more revenue to virtually all nursing homes (Ohio's system), the for-profit homes would gain more additional revenue than the nonprofit homes would, compared with the current cost-based rate structure of Connecticut nursing homes.

The remainder of this article is divided into three sections. First, the methodology and data used in the analysis are described. Brief descriptions of case-mix systems and of the simulation model are included in this section. The results of the analyses are presented in the second section. In the final section, the implications of the findings for Connecticut as well as other States are discussed.

Methodology and data

Case-mix reimbursement systems

Case mix generally refers to a measure of patients' condition and care needs; it thus largely defines a nursing home's "product" and can significantly affect costs, particularly nursing staff costs. Case mix may or may not be recognized by a payment system, and it can be addressed in various ways. These issues are of major importance in determining nursing home behavior and, ultimately, system outcomes in terms of cost, quality, and case mix.

As noted above, case-mix information has been incorporated into reimbursement systems in several States. Usually this involves a frequent (monthly or quarterly) detailed evaluation of each Medicaid patient's service needs, called a patient assessment. The Illinois point system was an early effort of this type. Patients were given points on the basis of service needs, and the value of a point was determined using regression analysis (Walsh, 1979). Similar approaches were developed for West Virginia, Ohio, and Maryland, although, as indicated in the following discussion, each State's system is unique.

Patient assessments are used in different ways in these three systems. In each system, however, patients are assessed in terms of their need for each of a specific set of services and the level, degree, or extent to which each service is required. In West Virginia, 15 service categories are used to prospectively set ceilings on per diem nursing services reimbursement. The Ohio State government drew on West Virginia's categories and added six rehabilitative services. These are used to retrospectively set ceilings on per diem reimbursement for the cost of nursing services. In Maryland, 4 patient classifications (based on dependency in 5 activities of daily living, or ADL's) and 10 specific services are used in a formula to determine patient-specific per diem reimbursement rates for the nursing services rate component. Although the services used differ among the States, they tend to be referred to as "standards" in each State. Therefore, that terminology is adopted in this discussion as well. The services (i.e., standards) used in each of the three States are presented in Table 1.

In case-mix reimbursement systems, the nursing time required for specific services is estimated by the State government on the basis of time-motion studies and expert opinion. Combining these standard service times with standardized nursing personnel wage rates, also calculated by the State government, yields estimated service costs for each of the services a patient might require. The aggregation of these service costs for a facility's Medicaid patient population can be used either to set reimbursement rates for the cost component of nursing services or to set facility-specific ceilings on per diem reimbursements that are directly tied to the facility's case mix.

The New York and Minnesota State governments have taken a different approach. Information similar to that shown in Table 1 is used to group patients into categories that need different amounts of resources in their care. These categories are called resource utilization groups (RUG's). The RUG method was originally developed by Fries and Cooney (1985). RUG-based systems tend to be based more on patient characteristics than on specific services. For example, dependency in an ADL, such as eating, is considered to represent a patient characteristic that is more costly than a lack of dependency. This dependency can be treated in many different ways using different services. The RUG's approach does not define specific ways or services in its reimbursement method. In contrast, the three State systems simulated here are more likely to relate such a dependency to the need for a specific type and level of service and thereby estimate facility rates. The RUG's approach was too recent a development to be included when the simulation model discussed in this article was first designed.

Table 1

Standards for case-mix reimbursement in Maryland, Ohio, and West Virginia

Maryland	Ohio	West Virginia
—	Behavioral/ mental status	Behavioral/ mental status
Bathing[1]	Personal hygiene[2]	Personal hygiene[2]
Dressing[1]	—	—
Eating[1]	Eating	Eating
Mobility[1]	Mobility	Mobility
Incontinence[1]	Incontinence/ catheters	Incontinence
—	—	Catheters
Turning and positioning[3]	—	—
Tube feeding[3]	—	—
Decubitus care[3]	Dressings and nonroutine skin care	Dressings
—	Medications	Medications
Single injections	Injections	Injections
Multiple injections	—	—
—	Appliances	Appliances
Restraints	—	—
—	Enemas or douches	Enemas or douches
Suctioning/ tracheostomy	Suctioning/ tracheostomy	Suctioning/ tracheostomy
Oxygen/aerosol	Oxygen/aerosol therapy	Oxygen/intermittent positive pressure breathing
Ostomy care	Colostomy, ileostomy, or ureterostomy	Colostomy, ileostomy, or ureterostomy
Intravenous/ subcutaneous	Intravenous and subcutaneous fluids	Intravenous/ subcutaneous
—	Habilitation[4]	—
—	Specialized services[5]	—
—	Physical therapy[5]	—
—	Occupational therapy[5]	—
—	Speech/audiology[5]	—
—	Psychological[5]	—

[1] Activities of daily living used to categorize patients into light, moderate, or heavy care classifications.
[2] Includes bathing, dressing, hair care, nail care, shaving, and dental care.
[3] Special services used to categorize patients into a heavy special care classification.
[4] Determines the need for physical and/or psychosocial rehabilitation therapies.
[5] Specific physical and psychosocial therapies.

By way of comparison, in the current Connecticut nursing home reimbursement methodology for operating (noncapital) costs, a prospective rate for each facility is set based on that facility's historical costs. (A fair rental approach is used for the capital component of the rate.) Ceilings are applied, but they are fairly generous. Private pay rates are also regulated. Therefore, the differential between Medicaid and private pay rates is likely to be less in Connecticut than in most other States.

Simulation model

The simulation model was designed to replicate reimbursement for the component directly affected by case mix, the nursing care component, for Maryland, Ohio, and West Virginia. To do this, a detailed understanding of the standards (or services) and the method used for payment in each State was needed. The methodological details include types of personnel, time estimates, frequency of service, and wage rate determination. This analysis of the details of each State methodology was carried out as part of the larger HCFA study (Foley et al., 1984) and refined here. In this section, we discuss several major descriptors of the three case-mix systems. These include service categories (Table 1), personnel classes, and time allocations to services, as well as other major characteristics (e.g., determination of wage level for each personnel class). Also, the assumptions that were necessary to tailor the simulation model to the specific aspects of the Connecticut system are briefly discussed.

As noted, the differences in service categories among the States are highlighted in Table 1. For example, the Maryland system does not include a separate category (or standard) for behavioral/mental status but does classify patients into light, moderate, or heavy care categories based on dependency in the five ADL's listed (bathing, dressing, eating, mobility, and continence). In addition, certain services, including turning and positioning, tube feeding, and decubitus ulcer care, are used to categorize patients into a heavy special care classification. Only the Ohio system explicitly identifies and reimburses for a series of rehabilitation services. Other differences in the three systems pertain to the level of care a particular patient is assigned within any one standard and, consequently, the type of personnel assigned to provide that level of care in each system. These differences can be illustrated by viewing what happens to a hypothetical patient under each system for a particular standard.

Consider the standard for oxygen therapy. A hypothetical patient needed and received oxygen therapy more than 15 days during the past month. This patient would be categorized in the third, or highest, level of care for this standard in West Virginia. In Ohio, the patient would be classified in the third out of four categories (the fourth being more than 15 aerosol treatments). In Maryland, the nursing home would receive a constant per diem reimbursement for the actual number of days the service was provided.

To obtain the data necessary to capture these differences in the simulation model, a fairly complex patient-level data collection instrument was designed and pilot tested as part of the larger study. All the necessary patient-level data were obtained through this instrument. Additionally, a series of variable transformations was created to classify each patient according to the standards, levels, and other items applicable to each of the three simulated systems.

The next step in the simulation process was to link the patient classifications to payment rates. Each State system relates categories of patient care to specific personnel types and time needed for each service. To continue with the example of the patient needing oxygen therapy, in the West Virginia payment system, a licensed practical nurse (LPN) is the assumed provider, and the time needed to provide the service is estimated as 16 minutes. In the Ohio system, an LPN is also assumed, and a total time of 17 minutes is estimated for service provision. Finally, in the Maryland method of payment, the standard of oxygen/aerosol therapy reimburses for both a registered nurse (RN) and an LPN to provide the service. The relative weights are 48 percent for the RN and 52 percent for the LPN. The total assumed time per day is .1042 hour, or approximately 6 minutes.

To translate these estimates of time needed for each service level into dollar amounts, hourly wage rates for the appropriate personnel types are multiplied by the time estimates. If the same wage levels are used for each State in the example, the per diem reimbursement for this particular service would be $2.82 in Ohio and $1.16 in Maryland, and it would range from $2.65 to $2.94 in West Virginia, depending on the size of the facility. As noted, the Maryland rate is adjusted for the patient's categorization as light care, moderate care, heavy care, or heavy special care.

The oxygen therapy example illustrates the considerable variation among the three States in the way that measures of patient need are translated into actual dollar payments. This example is for only one service and reflects some simplifying assumptions (wage rates). It should not be construed, therefore, as reflective of actual differences in total payment rates and/or relative generosity of any of the three systems. The example does show the complexity of these systems and the detail involved in trying to replicate, or simulate, the payment rates that would prevail in each system.

Several other characteristics that differentiate these systems were pertinent to the simulation model and were included to the extent feasible. State characteristics and simulation methods highlighted here are method of deriving wage rates, treatment of fringe benefits, use of ceiling payment rates, and other general differences.

The derivation of wage rates for actual payments varies across the three State systems. The systems vary in the number of personnel classes used as well as the level of wages. For example, in West Virginia the average wage of three specific skill levels is used, but in Ohio, payments are based on 115 percent of the statewide average salaries for eight categories of personnel. The simulation model replicated each State's personnel categories. However, only the Maryland method was used for deriving wage levels from Connecticut data. The 75tn percentile of wages in each personnel category was found for three geographic areas believed to reflect differences in the costs of living in Connecticut. By using only one method of deriving wage levels, the simulations highlight other differences in the structure of these three reimbursement systems.

The systems also differ as to whether fringe benefits paid to personnel are included in the calculation of the nursing care reimbursement rate. In West Virginia, fringe benefits are not included. In Ohio, they are included through an indirect adjustment (weighting) of the time allocation for certain services. In Maryland, fringe benefits are calculated and included directly in the payment rate. For these data, as with Maryland wages, a percentage "markup" for fringe benefits was calculated separately for the three Connecticut geographic areas. Each State system's approach to fringe benefits is replicated in the simulated rates.

The Ohio and West Virginia systems are similar in that the payment rate calculated from patient-level needs serves as a ceiling rather than an actual payment. Whenever the actual costs incurred for nursing services are less than the calculated rate, facilities are reimbursed their actual costs. Simulations (not shown here) were run for Ohio and West Virginia, reflecting this approach (Adams et al., 1985). The simulations reported here treat the ceilings as the actual rates. In Maryland, on the other hand, calculated rates are those actually paid out, and the simulations reflect this.

The three reimbursement systems differ in still other ways. Some differences were built directly into the simulation model, but others were judged not appropriate for modeling. In a few instances, data were not available to allow identical replication of a State payment system.

A feature of the Maryland system is an example of a system characteristic that could not be totally captured in the simulation process. In Maryland, if a patient's level of dependency improves (i.e., the patient moves from a heavier care ADL dependency level to a lighter care level such as from heavy special care to heavy care), the facility is still reimbursed at the heavier dependency level for 2 months. Because the measure of Connecticut patient status pertained to one point in time, the simulation model estimated only the lower payment level for these particular patients (i.e., without such bonuses). Although this procedure will underestimate the Medicaid payments under the Maryland system, it is expected that only a small proportion of the patient population and/or dollar reimbursements would be affected by bonus payments at any one point in time.

Differences among the systems led to the development of an important characteristic of the present simulation model. A unique benchmark was developed for each of the three State systems that is specific to the features that differentiate it from the other systems. For instance, the benchmark for the Ohio simulations takes into account the current amount spent on physical and speech therapists in Connecticut, whereas the benchmark for the other two systems does not. Use of benchmarks allows us to always compare current payments with simulated rates for the same set of services (i.e., that set of services used in the State system being simulated).

Connecticut samples and procedures

The simulation model was applied to data from a representative sample of 26 Connecticut nursing homes and their patients. These nursing homes were drawn as a 10-percent sample from a population list of 257 Connecticut facility units. This sample size was determined as necessary for statistical reliability in a fairly standard case-mix measure, the Katz ADL score (Katz et al., 1963; Adams et al., 1984). Using the facility-level mean and standard deviation for the Katz score from earlier studies, the sample size was based on an accepted error of about 10 percent of the mean and a 99-percent confidence level.

Several types of facilities were excluded: those that did not participate in Medicaid, homes for the aged, facilities that had been in operation for less than 1 year or had recently changed ownership, and those in which more than 40 percent of patients had a primary psychiatric diagnosis. These were viewed as "outliers," or not representative of the nursing home population as a whole. Facility units with less than 30 or more than 200 beds were also excluded from the sample. This eliminated patient populations too costly for data collection and/or with an insufficient number of Medicaid patients for analysis.

The resulting population from which the sample was drawn consisted of 257 separate units in rest homes with nursing supervision (RHNS) and chronic and convalescent nursing homes (CCNH). RHNS units correspond to intermediate care units, and CCNH units correspond to combined skilled and intermediate care units. Some Connecticut facilities are "duplicate" in that they have both types of units, with separate cost/rate reports and, consequently, Medicaid rates. Although units with more than 200 beds were excluded, facilities with two types of units could have a total facility bed count of more than 200. No unit of more than 200 beds was actually generated by our random sampling procedure; hence, no exclusion for large size was actually made.

The population of nursing home units was stratified by urban-rural and profit-nonprofit status to improve precision in the sample means. Based on the relative percentages in each cell in the population, the following numbers of each type were sampled: 17 urban profit, 5 urban nonprofit, 3 rural profit, and 1 rural nonprofit. Clearly, the fact that only one rural nonprofit facility was included means that the results for this category of nursing home must be considered as only illustrative.

Patient sampling and patient-level data collection were carried out by nursing personnel from the Connecticut Department of Income Maintenance. A 25-percent random sample of all patients (Medicaid and non-Medicaid) was chosen in each unit, resulting in a total sample of 601 patients from the 26 facilities visited.

The data collected through this process, as well as financial data obtained directly from the Connecticut Department of Income Maintenance and the accounting firm of Ernst & Whinney, provided indepth information on patient-level characteristics and service needs as well as facility characteristics, such as current Medicaid rates, bed size, percent Medicaid patients, and current operating expenditures. These data were then used to simulate alternative rates "as if" Connecticut nursing homes were reimbursed under the existing systems in Maryland, Ohio, and West Virginia.

Results of analyses

Financial outcomes

In this section, we provide the results of simulating the nursing component of the Medicaid rate for each of the three payment mechanisms and comparing them with current Connecticut payment rates. As noted, the current rates used in the comparison are specific to each State system's benchmark. It should also be noted that the simulations reported here are based on data from all patients in the sample, not just Medicaid patients, because Connecticut now pays on the average costs of all patients. However, additional simulations were run on Medicaid patients only, and the results are discussed later in this section. The tables highlight average changes in revenues and patterns by urban, rural, profit, and nonprofit status. Total projected costs to the State government of Connecticut (including Federal matching funds) for nursing care services under each alternative system are also presented.

Maryland system

The financial impacts at the facility level of shifting to the Maryland, Ohio, or West Virginia reimbursement system are summarized in Table 2. If the Maryland system had been used for 1984-85 payments to the sample of facilities in Connecticut, a minor net savings of $.55 per patient day, on average, would have occurred. The average dollar payment per diem under this system would have been $23.02, ranging from approximately $13 to almost $33 per patient day. This range shown in Table 2 is smaller than the range for current Connecticut rates using the Maryland benchmark assumptions—from $10 to almost $48 per patient day. The range of current rates, as well as the appropriateness of these rates for patient needs, were major issues raised by Connecticut policymakers.

The smaller range of payments under the Maryland system reflects shifts in revenues that would occur among facilities. As the data in Table 2 show, nonprofit facilities would experience major reductions in average reimbursements per patient day, but the for-profit facilities would gain. The biggest shifts in revenue would occur for rural facilities.

These shifts can be seen in terms of the correlation of the simulated payment rates with the facilities' current operating expenses. The correlation for the Maryland simulation, .32, is a substantial change from the current correlation, .78. Clearly, considerable changes in rates would occur among Connecticut nursing homes if the Maryland system, as modeled here, were adopted.

Table 2

Simulation results: Average change in Medicaid revenues per patient day, average payment per patient day, and correlation with operating expense, by type of reimbursement system and type of facility: Connecticut, 1984-85

Type of facility	Maryland system	Ohio system	West Virginia system
	Average change in revenues per patient day		
All sample facilities			
Mean	- $0.55	$6.12	- $3.65
Minimum	- 21.51	- 7.60	- 19.61
Maximum	7.13	14.05	0.29
Urban			
Profit	0.57	6.42	- 2.39
Nonprofit	- 5.73	5.12	- 7.33
Rural			
Profit	4.66	10.61	- 0.45
Nonprofit	- 9.16	- 7.60	- 16.09
All sample facilities	Average payment per patient day		
Mean	$23.02	$29.13	$16.40
Minimum	13.20	13.47	7.87
Maximum	32.63	40.98	21.57
	Correlation of simulated payment with operating expense per day		
All sample facilities	.32	.49	.35

Ohio system

A similar summary description of changes that would occur if Connecticut had used the Ohio reimbursement system and paid the calculated ceiling rates, irrespective of actual costs, is shown in Table 2. This system, on average, would be more expensive than the current system. The higher cost may partially reflect the fact that necessary rehabilitative services are reimbursed under the Ohio system. Of course, other structural differences may also lead to higher rates.

The Ohio system calculates ceilings for facility reimbursement. If a facility's costs are below this ceiling, it is paid on the basis of costs. Data on ceiling rates are not shown in Table 2. However, a simulation was run using this approach. Using these sample data, it was found that the Connecticut State government would actually save money, approximately $.60 per patient day, because the costs of only three facilities exceeded the simulated rate. In the long run, facilities are likely to increase expenditures up to the ceiling payment, so the ceiling rates are presented here.

As shown in Table 2, the per diem reimbursement using the ceilings as calculated rates would increase by an average of $6.12 for the sample of facilities. The simulated range of rates under the Ohio system would be greater than under the Maryland system but still not as wide as the difference of $38 per patient day in Connecticut's current minimum and maximum rates using the Ohio benchmark assumptions. The correlation of the Ohio simulated nursing rates with operating expenses per patient day is quite a bit higher than for the Maryland rates, .49 versus .32. This indicates that the adoption of the Ohio system would not be as great a shock to facilities in terms of changes in payment rates relative to current patterns of expenditure.

The Ohio system, as simulated, would distribute more funds to all facilities in the sample except rural nonprofit facilities. Again, more funds would be redistributed to for-profit homes than to nonprofit facilities. In the simulation, the average gains of $6 to almost $11 for the for-profit homes are greater than the gains to the urban nonprofit facilities of approximately $5 and the loss to the rural nonprofit homes of more than $7. The Ohio system would cost the Connecticut State government more on average. However, this type of redistribution among categories of facilities might be politically more acceptable to providers than the redistributions that result under the other simulated systems because most nursing homes would receive higher payments under the simulated Ohio system. (As noted earlier, the results for the rural nonprofit category must be regarded as illustrative because only one such facility was in the sample.)

West Virginia system

The changes in rates simulated for the West Virginia system are also presented in Table 2. With this system, again assuming that calculated rates are paid rather than used as ceilings, there is an average savings in reimbursements for nursing care services of almost $4 per patient day. The maximum savings per facility are $20 a day, and no nursing home gains more than $.29 in reimbursement per patient day. Thus, compared with the present Connecticut system, the West Virginia system may improve the relationship of payment to patient needs while actually saving money in overall reimbursements for nursing care services.

However, the inability to completely replicate the West Virginia system may be part of the reason it appears less expensive. In West Virginia, direct care nursing hours rather than total nursing hours are used to estimate hourly wage rates. This calculation could not be made in the current simulation because of lack of Connecticut data on direct care nursing hours. Thus, the appropriate wage rates for the West Virginia simulation may be higher than those actually used. It is not clear whether the dollar value derived using the West Virginia method would be greater than the 75th percentile of Connecticut personnel wages that was actually used in these simulations. Another relevant factor is the assumption in West Virginia that certain services can be provided by lower cost personnel than are assumed in the other systems (e.g., aides versus LPN's). This factor was built into the simulation model. The potential cost-quality tradeoffs involved deserve further study.

Payment rates and case mix

If the foregoing simulations provide insight into the financial consequences of implementing a case-mix system, a pertinent question concerns the policy benefits involved. What improvements, if any, would accompany the financial consequences? To assess this, we first consider how well the current system is working in terms of meeting the relative needs of each facility's patients.

The findings of this study suggest a somewhat stronger correlation between the current Connecticut payment rates and case mix than was found in earlier studies (State of Connecticut, 1984). For the sample of facilities used in this study, both the total State rate and the estimated nursing care component of that rate exhibited a positive and significant relationship with the following case-mix measures: the Katz ADL score (Katz et al., 1963; Shaughnessy, Schlenker, and Yslas, 1983), a resource utilization group (RUG) facility-level index, an indicator of the prevalence of long-term care problems, and an indicator of the prevalence of intense problems (Shaughnessy, Schlenker, and Yslas, 1983).

The Katz score sums the number of ADL's in which the resident has some dependencies. The RUG index is derived by weighting the frequencies of patients in each of the nine RUG categories with the mean time classification as calculated for the original RUG derivation (Fries and Cooney, 1985; Cooney and Fries, 1985). The prevalence of 21 problems characteristic of the long-term care populace was identified through the patient-level data collection instrument developed for this study. These are ulceration of skin, constipation, bowel incontinence, ostomy, urinary incontinence, catheter, mobility impairment, recovery from surgery, heart disease, hypertension, shortness of breath, diabetes, intraveneous therapy, end-stage disease, tracheostomy, urinary tract infection, depression, impaired mental status, inadequate social support, behavioral problems, and sensory deficit. The number of such problems per patient was measured at the facility level.

Of the problems identified, the more severe levels of 13 were considered to indicate intense problems and served to identify patients requiring high levels of care. They are ulceration of skin, bowel incontinence, urinary incontinence, mobility impairment, recovery from surgery, heart disease, shortness of breath, diabetes, end-stage disease, impaired mental status, depression, behavioral problems, and sensory deficit. For example, three levels of skin ulceration are identified: tissue destruction that does not enter the skin, tissue destruction that enters the skin but not muscle, and tissue destruction that extends into the muscle. The third level of ulceration of the skin is considered an intense problem.

Using both Medicaid and non-Medicaid patients to derive the case-mix measures for each sample facility, the simple Pearson correlations of the total State rate ranged from .36 with prevalence of problems to .44 with prevalence of intense problems.

An estimated current nursing rate was calculated by adding therapies and supplies to basic nursing care expenditures. It was felt that this estimate best accounted for all reimbursements made by the Connecticut State government for nursing care services as defined by any of the three case-mix systems.

The estimated nursing rate component exhibited an even stronger relationship to the case-mix measures than the total State rate did. These simple correlations for the sample of 26 facilities ranged from .59 to .69 according to the case-mix measure used. Both the simple Pearson correlations and the Spearman, or rank order, correlations are provided in Table 3 for the current Connecticut rates as well as for rates under the three simulated systems. The highest correlation of Connecticut nursing rates with case mix, .69, occurs for both the Katz score and the RUG facility-level index. The nursing rate is more strongly related to case mix than the overall State rate is. The strong relationship is based on the fact that costs actually incurred by facilities for nursing care services (which, in turn, become the basis for future payment rates) are inherently related to the needs of patients. However, administrative and capital costs, which are included in the total State rate, do not necessarily bear a strong relationship to patient needs.

Results indicate that the current Connecticut system generates payments related to the facilities' patient case mix. The question is whether this relationship is strong enough and/or cost efficient. A partial answer can be found by correlating the simulated rates for the Maryland, Ohio, and West Virginia systems with Connecticut facilities' case mix. Recall that only the nursing care rate components were calculated for these systems, so comparisons should be made only on that basis. The summary of correlations is presented in Table 3 using rates calculated on the basis of all patients sampled in each facility. (The correlation levels and patterns of relationships are similar when based on Medicaid patients only.) Several major conclusions can be drawn from this set of correlations.

- The correlations are higher for all three case-mix systems than for the current Connecticut system.
- Each system's rates are slightly weaker in their relationship to the prevalence of intense problems than to other measures of case mix.
- West Virginia rates exhibit the highest correlations with three of the four case-mix measures (all except intense problems), although the correlations are not much higher than those for the other two simulated systems.

Table 3

Correlation of simulated and actual nursing rates for Medicaid reimbursement with selected case-mix measures, by type of case-mix measure and type of reimbursement system: Connecticut, 1984–85

Type of reimbursement system	Case-mix measure[1]							
	Katz activities of daily living score		Facility resource utilization group index		Prevalence of problems		Prevalence of intense problems	
	Simple	Rank order	Simple	Rank order	Simple	Rank order	Simple	Rank order
Connecticut	.69	.56	.69	.56	.60	.55	.59	.52
Maryland	.91	.75	.90	.75	.87	.64	.84	.74
Ohio	.89	.71	.91	.78	.86	.73	.86	.73
West Virginia	.96	.83	.95	.82	.89	.76	.86	.73

[1] See the text for a detailed discussion of case-mix measures.

Based on the simulations, then, it appears that improvements could be made in the overall strength of the relationship of Medicaid payments to facility case mix if any of the three case-mix systems were used. Overall, the correlations are slightly higher for the West Virginia system than for the Ohio and Maryland systems, but these differences are minor compared with those between the current system and any of the case-mix systems. However, one must question whether the gains in better relating payments to case mix outweigh the costs, both direct and indirect, that would be incurred in moving to such a system. Another question is whether there are ways of measuring the effect of these alternative systems (other than simple correlations) that would make any one system the clearly desirable alternative. For example, does one system handle intense problems better than other systems do?

Additional analysis of this issue indicated that treatment of facilities with a high proportion of heavy care patients differs among the three case-mix systems. To determine the proportion of heavy care patients, the high-care levels of 6 of the 21 problems identified through the data instrument were classified as severe. These problems were considered to be characteristic of residents recently discharged from the hospital who needed costly resources and/or resources not currently available in nursing homes. The problems were ulceration of the skin, recovery from surgery, heart disease, shortness of breath, diabetes, and end-stage disease. The variable was measured as the percentage of patients with one or more such problems in each facility unit.

For each simulated system, the five facilities with the highest simulated rates were reviewed in terms of this heavy care variable. In five sample facilities, 20 percent or more of the patients had severe problems. The Ohio and West Virginia systems placed only one of these facilities in the highest payment rate group. The Maryland system, on the other hand, placed three such facilities in this group. Such long-term care problems are likely to become more prevalent in nursing homes over time. Therefore, the case-mix standards used by the case-mix systems should be evaluated, and possible modifications to improve the access of these heaviest care patients should be considered.

State-level costs

The simulations for individual facilities provided estimates of the general direction of change that could be expected under each system. One system (Maryland) appeared to generate costs close to current Connecticut costs, another (Ohio) would be more expensive, and the third (West Virginia) would be less expensive. These conclusions, however, were drawn from a sample of facilities. Estimates were needed of total costs to the State government. Such total cost estimates were derived by extrapolation. The simulated rates for the nonprofit, profit, urban, and rural facilities in the sample were assumed to be the same as rates for the total population of facilities of each type; that is, the number of each type of facility in the overall population of 257 facilities was used to extrapolate the sample results.

These estimates of State-level costs were then compared with current costs for nursing care services for the total facility population. As in all the simulations, the benchmarks of current costs were based on the different services included in each simulated system. Therefore, we were able to compare State-level costs under each system with costs currently being paid for the set of nursing care services relevant to that system. The benchmark estimates of current State spending for nursing care services provided to Medicaid patients (Table 4) ranged from almost $109 million under the West Virginia benchmark assumptions to nearly $130 million for services covered by the Maryland system. Remember that the major difference between these two systems is the exclusion of fringe benefits and direct nursing supplies in West Virginia and their inclusion in Maryland.

Table 4

Estimated State Medicaid payments for nursing services, current versus alternative reimbursement systems: Connecticut, 1984–85

Type of reimbursement system	Current payment[1]	Payment under simulated system	Simulated differences[1]	Percent change
West Virginia	$108,942,524	$95,263,674	–$13,678,850	–12.6
Maryland	129,742,752	133,927,217	4,184,465	3.2
Ohio	127,149,186	167,945,720	40,796,534	32.1

[1] Using benchmark assumptions for each reimbursement system.

NOTE: Sample simulation results were extrapolated to the total population of 257 Connecticut nursing facilities.

The estimation of total dollar reimbursements for the three systems is based on the rates in the simulations presented in Table 2. The estimates indicate that the West Virginia system could be operated for a total nursing care cost of about $95 million, for a total net savings of almost $14 million. These figures represent approximately a 13-percent reduction in total reimbursement for the set of nursing services covered by the West Virginia case-mix system. Thus, the West Virginia system appears to be a potentially cost-efficient method for better relating payment levels to case mix in Connecticut.

From the foregoing simulations, it was estimated that, on average, the Maryland system would also reduce reimbursements to the nursing homes in the sample. However, these estimates were descriptive of changes in reimbursement per patient day. Estimates of total reimbursements show that the Maryland system would result in slightly higher total payments than the Connecticut system currently makes. Current total dollar payments, using the Maryland benchmark assumptions, are nearly $130 million. The simulated total payments equal about $134 million, constituting an increase of about $4 million, only 3 percent higher than total current payments.

The reason for the differences in average versus total dollar changes under the Maryland system is that certain types of Connecticut facilities had higher averages of Medicaid patient days than others had. The rural profit facilities in the sample averaged around 28,000 Medicaid patient days, as opposed to about 20,000 days for urban nonprofit facilities and about 23,000 days for urban for-profit homes. Therefore, the simulated rates for the cells with relatively higher Medicaid patient days receive more "weight" in estimates of total State dollar reimbursements. In addition, rural profit facilities gained more revenues in the simulated Maryland system than other types of facilities did.

The Ohio system, as expected from the simulations for the sample, would result in additional costs to the State government. These additional reimbursements are estimated at approximately 32 percent of the total dollars now reimbursed—about $168 million versus a current total of about $127 million for this set of services. It should be noted that much of this increase is probably attributable to the additional rehabilitative services incorporated in the Ohio system and higher levels of reimbursement for these services.

Finally, it should be noted that Connecticut would generate additional Federal revenues if the costlier case-mix systems were set in place. This additional Federal funding must be taken into account when considering the cost of case-mix reimbursement. There is much uncertainty as to the type of Federal financial participation that will exist in the future, but the current Federal share for Medicaid expenditures is 50 percent for Connecticut. Therefore, the increase in the State government's own revenues that would be necessary to fund an Ohio-type system could be only about one-half of the increase described here.

Policy implications

Connecticut

The simulation results have direct policy implications primarily for Connecticut. The overall conclusion for policy is that an improved relationship of payments to case mix could be achieved at little cost in terms of direct payments to nursing homes. However, a redistribution of funds would occur under case-mix reimbursement. This redistribution of funds is the dominant, and perhaps most politically problematic, pattern of change indicated for Connecticut facilities. The shifts have implications not only for average and total State government payments. Ultimately, they may affect the ability and/or willingness of facilities to provide patient access to a given constellation of services and quality of care. The specific patterns of revenue shifts estimated by the simulations should be viewed as peculiar to the current cost structure of Connecticut facilities. The fact that nonprofit facilities in the Connecticut sample incurred significantly higher operating costs (approximately 38 percent for urban and 35 percent for rural) than their for-profit counterparts helps explain the results regarding redistribution.

The higher costs of nonprofit nursing homes are often attributed to case mix. Some studies have found that nonprofit facilities have more intense case mix than for-profit facilities have. (See Shaughnessy, Schlenker, and Yslas, 1983, for Colorado findings.) In this study, a similar, although not conclusive, pattern was found for the sample of Connecticut facilities (Adams et al., 1985). However, case-mix systems should adjust payment levels for case mix—if not perfectly, at least to a considerable degree. Thus, the redistribution away from nonprofit facilities suggested by the simulation results must be partially caused by other factors. For example, it appears that nonproprietary homes in Connecticut provide a different, perhaps broader, set of services than proprietary homes and provide services in a different manner. Therefore, they incur higher costs. It is unknown from the current analysis or other studies whether the higher costs are attributable to differences in efficiency or quality. The overriding conclusion, however, is that incentives for both nonprofit and for-profit homes would be altered by the adoption of a case-mix system of the type examined in the simulations.

A major benefit expected from adoption of a case-mix system is greater access to care for Medicaid patients, especially those with more intense service needs, who are therefore more costly to serve. Access is often difficult for Medicaid recipients because of the typically lower payments nursing homes receive for Medicaid compared with non-Medicaid residents (Cotterill, 1983; Scanlon, 1980). However, these conclusions concerning access for Medicaid residents were made about States in which the government did not regulate the private pay rate. The regulation of private rates in Connecticut therefore complicates the access issue somewhat.

One question for Connecticut is whether the provision of greater private patient days that undoubtedly results from the regulation of private pay rates comes at the expense of the Medicaid patient's access to care. However, because Medicaid per diem reimbursement is fairly high in Connecticut, Medicaid recipients with average care needs may not experience serious access problems. Rather, access is likely to be difficult for those potential residents with the highest care needs, both Medicaid and non-Medicaid.

Although severe access problems may not exist at this time in Connecticut, a move to case-mix reimbursement would affect access across facility types. Facilities currently incurring the highest costs, and therefore the highest Medicaid reimbursements, do not appear to be those with the most intense case mix. As their reimbursements are altered under a case-mix system, their incentives to provide access to public and/or private patients would also be altered. For example, higher cost facilities with high amenities and light patient care needs might find the market for their services significantly altered. This appears to be particularly true for nonprofit homes.

The revenue changes would affect decisions of facility administrators on how services will be produced and, ultimately, the quality of services. Although an immediate concern with a drop in revenues is that quality of services would decline, earlier research (Koetting, 1980; Schlenker and Shaughnessy, 1984) suggests that cost changes need not translate directly into quality changes. Conversely, the redistribution of revenues could increase the ability of facilities to provide necessary care of adequate quality for relatively higher case-mix needs, but it might not mean that the quality of care would increase significantly in other ways. An earlier study indicated that the range of nursing home services, particularly physical therapy, was positively related to costs (Lee and Birnbaum, 1983). The nonprofit facilities in Connecticut currently are more likely to provide these services than are the for-profit facilities. However, reductions in public revenues to nonprofit nursing homes, in the absence of additional private revenues, are likely to cause them to restrict this aspect of service provision.

Other States

Although the results of the simulation are specific to Connecticut, several conclusions about other States' policies can be drawn. These pertain to financial consequences as well as the implications for access and quality. In addition, this type of simulation model can be applied to virtually any current State system to better delineate the expected outcomes of policy change.

The ability to generalize to other States about the financial outcomes is somewhat limited. Yet, to the extent that other States using cost-based reimbursement exhibit similar patterns of profit versus nonprofit cost relationships that are independent of case-mix differences, similar patterns of redistribution would probably be observed. Several studies have confirmed that nonprofit homes consistently have higher costs than for-profit homes have (Bishop, 1980; Lee, Birnbaum, and Bishop, 1983). At least one study concluded that a significant part of the difference was probably attributable to lower efficiency for nonprofit nursing homes, but that such lower efficiency was partially dependent on the nature of the reimbursement method used (Frech and Ginsburg, 1981). Nonprofit facilities were more likely to have higher costs than for-profit homes under cost-based reimbursement than under a flat rate system. Thus, the Connecticut results presented here may be most applicable to cost-based reimbursement systems.

Two other aspects of the Connecticut system are important in considering the implications of these findings for other States. First, reimbursement levels in Connecticut are relatively generous (Cohen and Holahan, 1983). The level of a State's current payments relative to payments under the three simulated systems could be quite different in States with less generous payments. Second, private pay rates are regulated in Connecticut. The impact of case-mix reimbursement on financial outcomes as well as access would probably be different in States that do not regulate private pay rates.

For States in which payment levels are lower than those in Connecticut, all three systems might be more expensive (unless wage rates are also correspondingly lower). We would expect, however, that the relative costs of the three systems would be maintained as long as the case-mix patterns in other States are not dramatically different from those in Connecticut. All three case-mix systems may impose additional costs in States with lower payment levels, but the Ohio system would probably result in greater additional expenses than the Maryland or West Virginia systems would.

As discussed before, the regulation of private pay rates probably affects the access of both Medicaid and non-Medicaid patients. In addition, if regulation keeps private pay rates lower than they would otherwise be, it would take longer for a person to "spend down" and become eligible for Medicaid. This should reduce the number of persons becoming eligible for Medicaid through the spend-down process in any given time period, which, in turn, may affect the State government's total Medicaid expenditures. Thus, private pay regulation in Connecticut is important to that State government's consideration of a possible shift to case-mix reimbursement, and it also affects the generalizability of the Connecticut results to other States. Each State government considering a change to case-mix reimbursement should, therefore, conduct its own analysis of the advantages and disadvantages of such a change.

Finally, with respect to issues of access to care, many Medicaid beneficiaries may experience more problems in other States than in Connecticut. The

Connecticut Sate government pays relatively well for nursing services and restricts the differential in payment rates between public and private-pay patients. Because Connecticut does not now have severe access problems, the conclusion that shifting to a case-mix reimbursement system primarily improves access for the highest need patients may be unique to Connecticut. Other State governments could possibly achieve certain types of access improvements by regulating private pay rates (thereby reducing the differential between Medicaid and non-Medicaid rates). This policy, however, has not traditionally had widespread political support. Thus, in the majority of States, which do not regulate private pay rates, shifting to case-mix reimbursement might improve access significantly for the average patient, not just the patient needing relatively heavier care.

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Factors affecting appropriateness of hospital use in Massachusetts

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To determine the extent of inappropriate hospital use, and to investigate factors related to variations in appropriateness, 8,031 hospital records of patients discharged from 41 hospitals in 3 Massachusetts professional standards review organization (PSRO) areas were reviewed in 1973 and 1978. The Appropriateness Evaluation Protocol (AEP) was used for the reviews and logistic regression analysis was used to analyze factors associated with inappropriate use.

Based on the results, the authors conclude that utilization review should focus on: longer stays among surgical patients and shorter stays among medical patients; (projected) last third of the stay; and on diagnoses or diagnosis-related groups in which there is less clinical concensus on treatment method. For maximum effectiveness, utilization review must include incentives beyond simple monitoring (e.g., financial incentives).

Introduction

The current consensus in this country is that containing health care costs is not just a desirable goal but an economic necessity. There is widespread recognition that some portion of the utilization of hospital resources is inappropriate (Restuccia and Holloway, 1976; Querido, 1963; Rosenfeld, Goldman, and Kaprio, 1957; Forsythe and Logan, 1960; Van Dyke, Brown, and Thom, 1963; Zimmer, 1974; Berg et al., 1969; Restuccia et al., 1984; Gertman and Bucher, 1969; Morehead, Donaldson et al., 1964; Browning, 1965), in the sense either that patients receive services that provide no significant benefit or that the services could be rendered in a less costly setting. Because hospital costs are the largest single component of total health care expenditures, improving the allocative efficiency of hospital utilization has been a major objective of health planners and policymakers. With the advent of fixed-price, prospective payment by large payers such as Medicare, hospitals must reduce inappropriate use in order to achieve financial viability. Identifying and reducing inappropriate use is now of concern on an institutional as well as a policy level.

A number of programmatic interventions have been implemented to improve hospital efficiency, including professional standards review organizations (PSRO's), health systems agencies (HSA's), health maintenance organizations (HMO's), and various reimbursement schemes. Typically, the evaluations of such programs have been based on changes in total utilization (as measured by changes in admission rates and length of stay). Ideally, reduction in total utilization would be realized by reducing the proportion of use that is inappropriate, not by reducing all use across the board. Based on measurements of changes in total utilization, however, one cannot ascertain whether the observed changes reflect reductions in inappropriate use alone (a desirable means of improving efficiency) or in both appropriate and inappropriate use (an undesirable means). Clearly, to determine what in fact has occurred, and to target cost-cutting efforts effectively, it is important to determine absolute utilization rates, the proportion of use that is appropriate, and the causes of inappropriate use.

This article presents the results of an evaluation of the impact of PSRO's in eastern Massachusetts, the State with the second-highest average cost per hospital discharge in the Nation (United States Department of Commerce, 1984). The findings contribute both to the assessment of the PSRO efforts and to the formulation of the successor to the PSRO's, the peer review organization (PRO).

The Appropriateness Evaluation Protocol (AEP), an instrument specifically developed for such evaluations, was used in the study to determine appropriateness of use. Before the study design and findings are presented, the development and testing of the AEP is briefly described. The reader is referred to Gertman and Restuccia (1981) for more details.

Appropriateness Evaluation Protocol

Although several instruments have been used in the past to identify inappropriate hospital use, fundamental methodological problems with the measurement techniques used, notably poor interreviewer reliability, bias, lack of comprehensiveness, and sampling difficulties (Gertman and Restuccia, 1981; Kurylo, 1976; Holloway et al., 1976), limited the usefulness of those methods. Particularly critical in the poor performance of the instruments was the reliance on subjective, implicit criteria (Donabedian, 1975).

The awareness of the shortcomings of these existing approaches for determining the appropriateness of hospital days of care was the impetus for the development of an instrument for assessing hospital use, the AEP. The design of the AEP was based on a

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set of a priori objectives. The first was to develop a relatively simple tool that could easily be applied to as many patients as possible, in order to maximize its utility and generalizability and minimize implementation costs. Therefore, the initial decision was to design a diagnosis-independent instrument. It was recognized that this approach would not be applicable to all patients, so the initial goal was to develop one instrument for all adult medical, surgical, and gynecological patients.[1]

The second objective was to develop a set of explicit criteria by which, if any single one were met, the day of care would be judged appropriate at an acute hospital level of care. The original criteria set was developed by the AEP physician reviewer and two utilization review nurses, based on previous work on levels-of-care criteria (Gertman and Restuccia, 1981; Holloway et al., 1976; Restuccia and Holloway, 1976). The criteria items were categorized into medical services, nursing/life support services, and patient-condition factors (Figure 1). The first two criteria groups consist of services that would be provided routinely and safely only on an acute hospital level of care. Therefore, a patient receiving any of these services on a given day would justifiably require hospitalization on that day. The third criteria group consists of factors indicating that the patient's condition is so unstable that hospitalization is required, even though no medical or nursing/life support services are provided on a given day.

For practical reasons, an upper limit of a total of 30 criteria items was set. This would provide a manageable list that could be readily memorized by reviewers, thereby facilitating increased reliability and efficiency in abstracting information from medical records. As with all utilization review methods based on specifying a priori criteria for determining appropriateness, the AEP should be seen as a screening tool, best applied to aggregates of patients or to flag patients for individualized review by a clinician, and not as the definitive arbiter of appropriateness (Donabedian, 1982).

The final objective was to be able to ascertain the reason for a day being judged inappropriate in order to provide information to target interventions. To accomplish this, a list of reasons adapted from Restuccia and Holloway's "Barriers to Appropriate Utilization" (1976) was incorporated into the instrument. If a day was deemed inappropriate, the reviewer was asked to determine whether physician, hospital, patient, or environmental factors were responsible for the inappropriate day.

An override provision was developed and tested in this study to allow the reviewer to indicate either that the criteria set was not sufficiently comprehensive because some noncriteria service or factor necessitating hospitalization had occurred on that day (i.e., a "false negative") or, conversely, because a patient meeting one of the criteria nevertheless did not need acute level hospitalization (i.e., a "false positive"), perhaps because the service that met the criterion was not clinically justified. All overrides were reviewed by the AEP nurse and/or physician reviewers. The override provision was subsequently refined and is now available as an AEP option, for reviewers who receive special training and monitoring. The override was used on only 5 percent of the records in this study; it had no net effect on the results, which are therefore reported based solely on the basic criteria, without the use of overrides.

Initial developmental testing of the AEP at Boston University Hospital, in conjunction with feedback from physician committees of the participating PSRO's, resulted in modification and refinement of the original criteria items. The final 27 criteria items are shown in Figure 1. The criteria list was extensively tested for face validity (as determined by review by the PSRO physician committees), construct/concurrent validity (by comparing results from AEP reviews and reviews by a panel of expert physician reviewers), and reliability (interobserver and overall agreement). Results of the AEP evaluations conducted for this and subsequent studies indicated that it marks a significant advance over previous instruments, and that it is a reliable and valid instrument (Gertman and Restuccia, 1981; Restuccia et al., 1984).

Methods

The goal of the study, which was initiated by the executive directors of PSRO's in Massachusetts, was to evaluate the impact of PSRO efforts on improving the appropriateness of hospital utilization in the State. The objectives were threefold:

- To measure the amount of inappropriate hospital use.
- To identify factors associated with variations in inappropriate use among types of patients and hospitals.
- To determine whether there was any change in the amount of inappropriate use after implementation of PSRO-mandated concurrent review.

Of the five PSRO's in the State, three accepted invitations to participate in the study. They were primarily urban, suburban, and mixed urban-suburban-rural. All were in the eastern portion of the State. All the hospitals from each of the two latter PSRO's and a random selection of one-third of the hospitals from the urban PSRO were included in the study.

In each of the 41 surveyed hospitals, a random sample of patients was selected from all adult medical and surgical patients hospitalized on the third Wednesdays of May 1973 and 1978. Thus, the population from which the sample was drawn consists of all days of care received by patients hospitalized on the adult medical and surgical services of the 41 hospitals on these two dates. The first year was

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[1] Criteria related to day of admission, pediatric services, and the site of and timeliness of elective surgery were subsequently developed and tested, and are now available as options of the AEP.

Figure 1
Criteria of appropriateness of day of care: Massachusetts, 1973 and 1978

Medical services

1. Procedure in operating room that day.
2. Scheduled for procedure in operating room the next day, requiring preoperative consultation or evaluation.
3. Cardiac catheterization that day.
4. Angiography that day.
5. Biopsy of internal organ that day.
6. Thoracentesis or paracentesis that day.
7. Invasive central nervous system (CNS) diagnostic procedure (e.g., lumbar puncture, cysternal tap, ventricular tap, pneumoencephalography) that day.
8. Any test requiring strict dietary control, for the duration of the diet.
9. New or experimental treatment requiring frequent dose adjustments under direct medical supervision.
10. Close medical monitoring by a doctor at least three times daily (observations must be documented in record).
11. Postoperative day for any procedure covered in numbers 1, 3, 4, 5, 6, or 7 above.

Nursing/life services

1. Respiratory care: intermittent or continuous respirator use and/or inhalation therapy (with chest, physical therapy, intermittent positive pressure breathing) at least three times daily.
2. Parenteral therapy: intermittent or continuous intravenous (IV) fluid with any supplementation (electrolytes, protein, medications).
3. Continuous vital sign monitoring, at least every 30 minutes, for at least 4 hours.
4. Intramuscular (IM) and/or subcutaneous (SC) injections at least twice daily.
5. Intake and output measurement.
6. Major surgical wound and drainage care (chest tubes, T-tubes, Hemovacs, Penrose drains).
7. Close medical monitoring by nurse at least three times daily, under doctor's orders.

Patient condition

Within 24 hours on or before day of review:

1. Inability to void or move bowels (past 24 hours) not attributable to neurologic disorder.

Within 48 hours on or before day of review:

2. Transfusion due to blood loss.
3. Ventricular fibrillation or electrocardiogram (ECG) evidence of acute ischemia, as stated in progress note or in ECG report.
4. Fever of at least 101° rectally (at least 100° orally), if patient was admitted for reason other than fever.
5. Coma: unresponsiveness for at least one hour.
6. Acute confusional state, not due to alcohol withdrawal.
7. Acute hematologic disorders (significant neutropenia, anemia, thrombocytopenia, leukocytosis, erythrocytosis, or thrombocytosis) yielding signs or symptoms.
8. Progressive acute neurologic difficulties.

Within 14 days before day of review:

9. Occurrence of a documented, new, acute myocardial infarction or cerebrovascular accident (stroke).

chosen as the "preconcurrent utilization review" period, because it pre-dated almost any concurrent utilization review activities in Massachusetts. By 1978, utilization review was well established in each of the PSRO areas.

It should be noted that inference cannot be made to the entire years 1973 and 1978, because only 1 day in each year was sampled and because temporal factors such as day of the week and season of the year may be related to appropriateness of hospital use. However, another study investigating these relationships in four other PSRO areas found them to be statistically insignificant, except in one region where inappropriate days were more likely to occur in fall than in spring and winter (Restuccia et al., 1984).

To determine whether or not the rate of inappropriate use changed markedly since the utilization reviews reported in this article were conducted, the rates of inappropriate admissions and patient days detected in 1973 and 1978 were compared for six of the study hospitals that had had AEP reviews conducted from 1982 to 1985. Although the rates from 1982–85 are not strictly comparable with those from 1973, since the later reviews had the advantage of using objective AEP admissions review criteria (developed and tested in the same manner in which the patient days criteria were developed), the comparison does indicate that, on a gross level, rates of inappropriate utilization have not changed appreciably, at least in these six hospitals, with the passage of time (Table 1).

Data collected for each patient included patient demographic and illness episode characteristics, e.g., age, sex, length of stay (LOS), as well as characteristics of the hospital providing services.

In addition to the day-of-care appropriateness decision, as based on the AEP criteria, the reviewers were asked to make a subjective judgment as to whether the hospital admission was appropriate or inappropriate.

It was recognized that successful implementation of utilization review activities was not equal in all hospitals, and that the marginal effect of the PSRO program was expected to vary across institutions. Therefore, prior to the beginning of the study, the PSRO executive directors were asked to provide numerical ratings of the expected effectiveness of utilization review activities for each hospital in three areas: technical competence of the utilization review coordinator staff, technical competence of the

Table 1

Comparison of rates of inappropriate admissions and patient days in six of the study hospitals: Massachusetts, selected years 1973-85[1]

	Inappropriate admission rates[2]		Inappropriate patient days rates	
Hospital	1973 and 1978	1982, 1984, and 1985	1973 and 1978	1982, 1984, and 1985
A	4.0	9.0	25.0	35.4
B	8.0	10.0	23.7	22.0
C	5.0	7.0	23.4	18.0
D	5.0	36.7	38.1	46.1
E	5.8	10.9	44.0	28.0
F	5.7	5.2	33.3	18.1

[1] Hospitals A, B, and C were reviewed in 1982 and hospitals D, E, and F were reviewed in 1984-85.

[2] Inappropriate admission rates were determined subjectively in 1973 and using objective criteria in the other years.

Table 2

Ratings of effectiveness of study hospitals, by type of hospital: Massachusetts, 1973 and 1978

	Numbers of hospitals		
Hospital type	Effective	Ineffective	Total
Total	25	16	41
Teaching[1]	3	4	7
Community			
CCU[2] and PSYCH[3]	5	5	10
CCU only	3	2	5
PSYCH only	11	3	14
Neither	3	2	5

[1] Each teaching hospital has a CCU and a PSYCH service.

[2] CCU: Coronary Care Unit. CCU is interpreted to represent high technology service in this sample of hospitals.

[3] PSYCH: the presence of at least one kind of psychiatric service.

utilization review committee, and willingness of the hospital to police its utilization problems. Based on a summary of the ratings of expected effectiveness, each hospital was designated by the investigators as either "effective" or "ineffective."

Because individual factors influencing appropriateness may not act independently, considering them together through multivariate statistical analysis can eliminate spurious effects and reveal differences that are otherwise obscured. A log linear model was therefore used to model the joint effect of many factors. In addition, the model estimates the level of inappropriate use free from sampling error.

Results

A total of 8,031 patient days was evaluated. Nine percent of the cases (714) were judged inappropriate admissions based on reviewer subjective assessment of the hospital admission. To avoid overestimating the percentage of inappropriate days, these cases were excluded from subsequent analyses of the days data. Of the days reviewed from cases deemed inappropriate admissions, 75 percent was judged inappropriate, more than 2 times the percent of inappropriate days for patients appropriately admitted.)

To identify particular patient and/or hospital characteristics that significantly affect the level of appropriateness, a list of potential explanatory factors was selected by a combination of subjective judgment and exploratory analysis of the data. The continuous variables—length of stay and age of patient—were converted to multichotomous variables based on a priori judgments and review of the data. Hospital types and services were selected on the basis of a factor analysis. The explanatory factors considered included the following:

- Length of stay: 0-10 days, 11-21 days, 21 or more days.
- Review year: 1973, 1978.
- Part of hospital stay when review occurred: first third, middle third, last third.
- Patient years of age: 1-50(Med)/1-40(Surg), 51-65(Med)/41-65(Surg), 66-75, 76 or over.
- PSRO area.
- Hospital effectiveness: effective, ineffective.
- Type of hospital: teaching (major teaching hospitals with coronary care units (CCU's) and psychiatric units); community hospitals (all others, including secondary teaching and nonteaching). Community hospitals were subdivided into four groups: with CCU and psychiatric units; with CCU only; with psychiatric only; and with neither CCU nor psychiatric units (Table 2).
- Type of insurance: public, private.

The results indicated that inappropriate hospital use was prevalent in this sample of 41 Massachusetts hospitals. The overall level of inappropriateness was 28.1 percent. For medical patients the level of inappropriate use was 32.2 percent; for surgical patients it was 24.3 percent. Because of this difference between medical and surgical patients, as well as their different clinical and therapeutic needs, each population was subsequently considered separately.

Table 3 summarizes the percent of inappropriate days for the explanatory factors and indicates which explanatory factors were found to be statistically significant, after controlling for interactions through the log linear model.

The strongest effect for both medical and surgical patients is the increase in the level of inappropriate use during a hospital stay. The pattern is slightly different for medical compared with surgical patients (Figure 2). The level of inappropriate use increases constantly during a hospital stay for the former, while for the latter, there is no significant difference between the beginning and middle of the stay, but a significantly higher level at the end of a stay. The absolute length of stay has a highly significant effect only for surgical patients. Their level of inappropriate

Table 3

Percent and statistical significance of explanatory factors for inappropriate days, by type of service: Massachusetts, 1973 and 1978

Factor	Hospital service Medical	 Surgical
Overall	32.2	24.3
Part of stay reviewed		
First third	[1]16.6	[1]14.9
Middle third	[1]31.0	[1]16.6
Last third	[1]48.0	[1]42.2
Length of stay in days		
1-10	[2]34.2	[1]17.5
11-21	[2]33.6	[1]27.9
22 or more	[2]28.5	[1]30.2
Patient years of age		
15-50 (Med)/15-40 (Surg)	34.4	20.1
51-65 (Med)/41-65 (Surg)	29.3	23.8
66-75	31.1	26.6
76 or more	34.4	30.0
Year of review		
1973	[1]34.6	23.3
1978	[1]30.2	25.4
PSRO[3]		
Suburban	29.1	[2]17.5
Urban	32.8	[2]27.2
Mixed (Suburban, urban, and rural)	33.2	[2]23.1
Hospital type		
Teaching	[1]28.3	[1]25.7
Community	[1]33.0	[1]23.9
CCU[4] and Psychiatric	[1]30.7	[1]21.1
CCU only	[1]33.1	[1]23.9
Psychiatric only	[1]33.3	[1]23.9
Neither	[1]40.6	[1]31.6
Reimbursement		
Public	32.1	28.2
Private	32.2	21.9
Interactions		
Hospital effectiveness by year of review	[1]<0.0001	[5]N.S.
Hospital type by part of stay reviewed	[1]<0.002	[5]N.S.
Reimbursement by length of stay	[1]<0.01	[5]N.S.

[1] Significant at 99 percent.
[2] Significant at 95 percent.
[3] PSRO: professional standards review organization.
[4] CCU: coronary care unit.
[5] N.S.: not statistically significant.

use is lower for stays of 10 days or shorter compared with longer stays, but there is no significant difference between 11-to-21-day stays and longer ones. The effects of the absolute length of stay and of the third of the stay reviewed are independent.

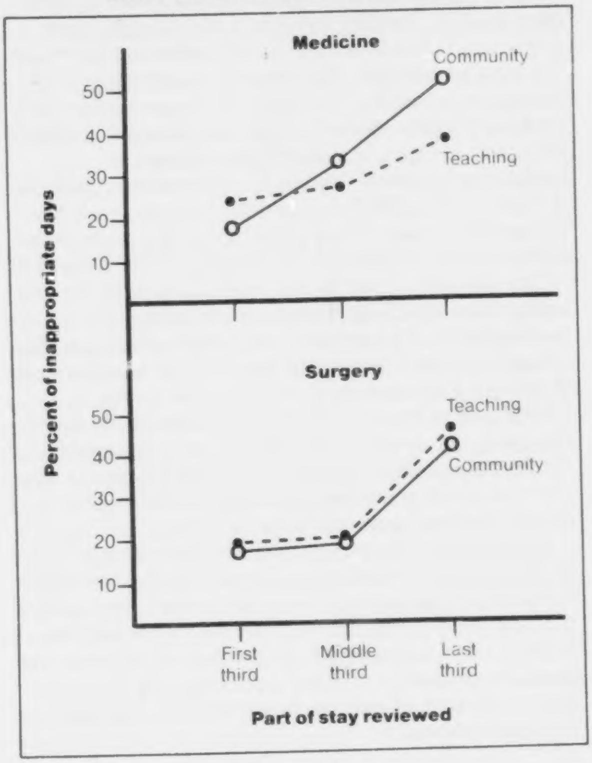
Rates of inappropriateness vary greatly by hospital, ranging from 23.2 percent to 54.5 percent for the urban PSRO, from 23.4 percent to 33.3 percent for the suburban PSRO, and from 19.2 percent to 44.6 percent for the mixed PSRO.

For both medical and surgical patients in community hospitals, those hospitals with both CCU and psychiatric services have a significantly lower level of inappropriate use compared with community hospitals with one or none of these services. However, when comparing all community hospitals to teaching hospitals, medical and surgical patients exhibit different patterns of inappropriate use. Medical patients were more likely to have inappropriate days when hospitalized in community hospitals, but the opposite holds true for surgical patients. In further contrast to surgical patients, medical patients exhibit an interaction between hospital type and at what point in the stay the review occurs (Figure 2). Inappropriate use increases at a lower rate during the course of a stay in teaching hospitals compared with community hospitals, among which there are no significant differences. For surgical patients, there are no significant interactions between hospital type and part of stay reviewed.

Univariate analysis of the relationship between payer (Medicare, Medicaid, Blue Cross, commercial insurers, other third party, and self pay) and inappropriateness indicated a significant difference among payers, with the two public payers having slightly higher rates of inappropriateness (36.73 percent and 35.56 percent, respectively) than the others (which ranged from 27.86 percent to 30.96 percent). Because of interactions between payer and

Figure 2

Percent of inappropriate days, by hospital type and part of stay reviewed: Massachusetts, 1973 and 1978



other factors, however, these relationships were not significant when multivariate analysis was applied (Table 3).

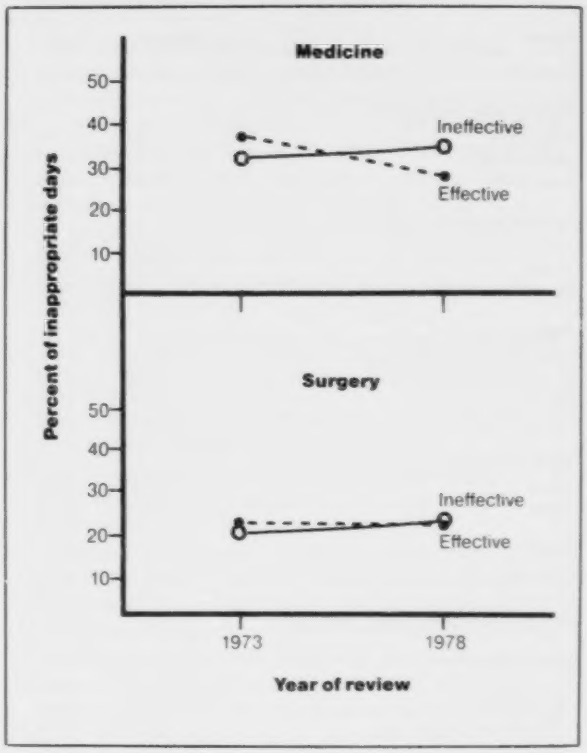
The year of review is a significant factor for medical patients: inappropriateness is lower in 1978 than in 1973. By year, there is a highly significant difference between effective and ineffective hospitals for medical patients. The level of inappropriate use decreased from 36.6 percent to 27.1 percent for medical patients treated at effective hospitals, while there was a slight, nonsignificant increase at ineffective hospitals (Figure 3). There were significant differences by PSRO for surgical patients, with the urban and the suburban areas having the highest and lowest levels, respectively, of inappropriate utilization.

The majority (over 88 percent) of the days deemed inappropriate were attributed to physician responsibility. This pattern was consistent across the two services and among the parts of the stay reviewed (Table 4). Environmental factors, reasons for inappropriate days beyond the immediate control of the physician, hospital, or patient, were responsible for approximately 7 percent of the inappropriate days for each service, and hospital and patient/family factors for approximately 1 percent each.

Nonphysician factors were more likely to contribute to days being deemed inappropriate during the latter portions of the stays (for both services) than during the first third of the stays. Table 5 lists the specific reasons most frequently cited for days failing to meet the appropriateness criteria, by service. This same general pattern of reasons was present in each third of the stay reviewed.

Figure 3

Percent of inappropriate days, by effectiveness of hospitals' utilization review systems and year of review: 1973 and 1978



Discussion

Perhaps the most noteworthy result is the substantial level of inappropriate use at the time of the study (as indicated by the percentage of inappropriate patient days among appropriately admitted patients): 32.2 percent of the days reviewed of patients on medical services and 24.3 percent of the days of surgical patients were judged to have been medically unnecessary, as indicated by the AEP review. Given the high average length of stay and the high average cost per stay in Massachusetts, the contribution of inappropriate use to the State's high utilization and cost levels warrants further investigation.

Several of the factors found to explain high rates of inappropriate use point to general strategies for planning and targeting utilization reviews: the fact that longer stays among surgical service patients have higher levels of inappropriate days suggests that utilization review efforts be targeted to especially long stays. Among medical patients, shorter stays have higher levels of inappropriate use, suggesting that such efforts to reduce length of stay be targeted to short stays. In addition, the higher percentages of inappropriate use during the last third of the stay, regardless of the absolute length of the stay or the service, suggests that, as much as is feasible, concurrent review efforts for admitted patients should be conducted prior to the (projected) final third of the stay, to anticipate and prevent inappropriate use during that period.[2]

The relative lack of impact of PSRO utilization review efforts among the ineffective hospitals in reducing inappropriate days suggests that the final effect of the PSRO's on inappropriateness was dependent on institutional cooperation and not on the efficacy of the monitoring process itself. Thus, the mere presence of a monitoring system cannot necessarily be expected to have an impact. Hospitals (and physicians) must be given incentives, financial or otherwise, to respond to information about their particular inefficiencies by reducing inappropriate use. For example, incentives for hospitals to reduce days of care (but not admissions) are inherent in Medicare's diagnosis-related group (DRG) prospective payment system.

The wide variation in rates of inappropriateness among individual hospitals suggests that efforts to

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[2] For further discussion of the timing of review, the reader is referred to Donabedian, 1985, pp. 80-87.

Table 4

Distribution of patient days failing to meet criteria for appropriateness, by service, responsible party, and third of stay reviewed: Massachusetts, 1973 and 1978

	Type of service							
	Medical service				Surgical service			
Responsible party	First third of stay	Second third of stay	Last third of stay	Entire stay	First third of stay	Second third of stay	Last third of stay	Entire stay
Total	113	471	614	1,198	110	205	534	849
Physician	89.38	89.17	88.60	88.90	92.73	86.34	87.45	87.87
Hospital	1.77	.64	3.26	.58	1.82	.49	.75	.82
Patient/family	0.00	.85	1.63	1.17	0.00	.98	.94	.82
Environmental	5.31	7.22	7.49	7.18	1.82	6.83	7.49	7.07
No response given	3.54	2.12	1.95	2.17	3.64	5.37	2.62	3.42

NOTE: Days deemed appropriate are excluded from the table.

Table 5

Most frequent reasons days failed to meet criteria for appropriateness, by service: Massachusetts, 1973 and 1978

	Percent of days deemed inappropriate	
Reason	Medical service	Surgical service
Service could have been provided at a lower level of care (including outpatient department or home) (P)[1]	51.84	51.47
Physician's medical management of patient is overly conservative (P)[1]	28.96	24.85
Physician delays scheduling of test or procedure (P)[1]	6.09	8.01
Unavailability of SNF[2] bed (E)[3]	3.76	2.12
Patient is convalescing	1.42	3.77
Miscellaneous reasons and no response given	7.93	9.78

NOTE: Days deemed appropriate are excluded from the table.

[1] (P) designates physician responsibility.

[2] SNF: Skilled nursing facility.

[3] (E) designates environmental responsibility.

reduce inappropriate use should be specifically targeted for maximum effectiveness. The AEP reasons list provides the sort of detail needed to tailor corrective action to a hospital's or an area's problems. Where physician behavior or hospital habit is responsible, educational efforts focused on specific problems may work, especially if reinforced with appropriate (dis)incentives. Where insufficient equipment or understaffing creates wasteful queues, redistribution of capital resources may be the answer. Where a regional lack of skilled nursing facilities and/or chronic disease hospitals cause a large portion of inappropriate acute hospital days, one may be forced to choose between acceptance of the status quo and development of new nursing or home health care programs, possibly at no net savings for the health care system. Also, use of the AEP to develop physician-specific profiles of inappropriate or nonacute use in one region has been accompanied by the reduction of nonacute patient days of Medicare patients by about one-third (from approximately 25.5 percent to approximately 16.7 percent of the total days reviewed) (Borchardt, 1981). However, a recent AEP study of appropriateness in the Rochester, N.Y. area, which has a well-developed system of sub-hospital-level health care services and facilities and relatively low health care costs, found that less than 10 percent of days were nonacute (Delaney, Restuccia, and Refior, 1984). This level may approach a base below which it is not feasible or optimally efficient to reduce inappropriate use in the shortrun.

The fact that most of the inappropriate use detected was attributed to the physician and/or hospital suggests that the potential payoff of interventions directed at hospital management practices and physician practice patterns can have a high return in reducing inappropriate use.

The complex interactions between hospital type and inappropriateness indicate that further investigation is necessary before definitive conclusions can be drawn regarding the relationship between these two variables. A number of factors not directly included in the study (for example, severity of illness, different levels of expertise in psychiatric illnesses, high technology services) but included by proxies (teaching status, existence of psychiatric units and/or CCU's) could account for the differences among types of hospitals.

The greater impact on inappropriateness of the PSRO utilization review among medical as contrasted with surgical patients is noteworthy. It may reflect that the AEP technique does not question the need for a surgical procedure, and that there is less concensus among clinicians on standards for treating medical patients. The latter is also suggested by the greater variability in costs of physician services observed in medical as compared with surgical DRG's (Mitchell, 1985). This implies that utilization review efforts by PRO's, other medical review organizations, and hospitals should be targeted on those diagnoses in which less consensus does exist.

Finally, the fact that there are differences in inappropriateness across different types of hospitals, among different types of patients, and among different types of hospital stays, reinforces the point that the urgency of cutting hospital costs not be allowed to lead to across-the-board cuts in use. Decreasing total utilization of medical facilities will be a social failure if it is accomplished by cutting appropriate as well as inappropriate use. Considering the magnitude of inappropriate use in our findings (even if some reductions have occurred since the time of the study), there is a great opportunity for savings. Concentration on identifying and correcting the specific problems in each hospital or region is the best and most effective way for the new peer review organizations that have succeeded PSRO's, for individual hospital administrators, and for health insurers and policymakers concerned with reducing health care costs, to proceed.

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Should children's hospitals have special consideration in reimbursement policy?

by Michael J. Long, Janice L. Dreachslin, and James Fisher

Children's hospitals were excluded indefinitely from the prospective payment system until a methodology for their reimbursement could be developed. Special consideration in reimbursement policy could be made for children's hospitals if their patients were generally more resource intensive than the pediatric patients of other hospitals.

The resource intensity of patients in children's hospitals was compared with pediatric patients in other hospital groups. The results indicate that the patient population of children's hospitals is similar to the pediatric patient population of university hospitals and considerably different from the pediatric patient populations of the urban and rural hospitals.

Introduction

Recognizing that the reimbursement methodology for Medicare inpatient care was contributing to the rapidly escalating national medical care expenditures, Congress enacted Public Law 98-21 in April 1983. The act provided for an entirely different reimbursement methodology, one that completely discarded the retroactive, cost-based method and introduced a prospective price-per-case method based on a patient classification system known as diagnosis-related groups (DRG's) (Fetter, Shin, Freeman et al., 1980).

Described by some as the most significant change in the health care field since the introduction of Medicare and Medicaid (Bambridge and Geeb, 1983), this new reimbursement methodology establishes, prospectively, a unique price for each of 468 DRG's. With some consideration for length-of-stay outliers and cost outliers, this methodology dictates that when the cost to treat a specific patient DRG exceeds the prospectively established price for that DRG a hospital will generate a deficit. When the cost to treat is less than the established price, a hospital will generate a surplus. Clearly, this new method of reimbursement provides an incentive for hospital administration to cut costs.

Under the current administration of the DRG program, because the established price for each DRG is intended to reflect the consumption of resources necessary in the treatment of an average patient within the DRG, the classification system is generalizable to all hospitals operating in such a system. If the resource consumption within a DRG varies systematically according to the type of hospital, the present classification system would not be a representative base from which to establish an equitable reimbursement system.

Given this limitation, the legislation excluded certain specialty hospitals from this reimbursement methodology. One such group of hospitals, children's hospitals, was indefinitely excluded until the possibility of developing a payment system that would adequately address their unique resource consumption pattern could be investigated.

A case for special consideration in reimbursement policy could be made for children's hospitals if it could be demonstrated that the patients they treated were generally more resource intensive than pediatric patients treated in other hospitals. If this were so, the special consideration might include greater reimbursement for each DRG or certain DRG's. It is also possible, however, that the DRG classification system as it now stands is an inadequate classification system for pediatric patients. Special consideration might then include a new or a revised classification system specifically for children's hospitals or pediatric patients.

These two perspectives of justified special reimbursement consideration provide the focus for this research. This study first sought to compare the resource intensity of patients in children's hospitals with pediatric patients in other hospital groups. It then compared the ability of the DRG classification system to explain variance in the resource variables with that of a revised DRG classification system developed in this article.

Methodology

Data source and sample selection

Information in this study is based on data from the 1982 Professional Activity Study (PAS) of the Commission on Professional and Hospital Activities (CPHA). With more than 1,200 member hospitals from all geographic areas of the country, this data base contains more than 16 million patient records with a high degree of national generalizability (CPHA, 1982).

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Five separate pediatric populations were identified for this article, with the following exclusions being made from each of the universes:

- Major diagnostic category 14, Pregnancy, childbirth, and the puerperium.
- DRG 391, Normal newborns.
- DRG 469, Valid diagnosis but not as principal diagnosis.
- DRG 470, Ungroupable, record does not meet criteria for any DRG.
- Length of stay (LOS) longer than 99 days.,
- Incalculable LOS.
- Stillborns.
- Charges not recorded adequately, charges less than $100 and more than $2,000 and those cases in hospitals where less than 10 percent of charges were reported. (These cases were dropped only for the analyses involving charge data.)

Children's hospitals

The PAS data base included 39 children's hospitals. Five of these were identified as specialist hospitals and were therefore dropped from the sample. The remaining 34 hospitals yielded the 235,286 discharges during 1982 that were used in this study.

Comparison groups

It is recognized that the pediatric mix may vary across distinct hospital types. The patient population of children's hospitals is, therefore, compared with the pediatric populations (patients between 0 and 17 years) of four comparison hospital groups: university hospitals with pediatric residencies, all other hospitals with pediatric residencies, urban hospitals without pediatric residencies, and rural hospitals without pediatric residencies.

The criteria for establishing the four comparison groups were as follows:

- For credibility and manageability, the overall total number of discharges for all four groups was established as 250,000.
- Of the 250,000 discharges, 15 percent should be from teaching hospitals and 85 percent from nonteaching hospitals in order to reflect the national discharge distribution.
- National data indicate that 14 percent of the total hospital discharges were pediatric discharges (excluding newborns). Because the hospitals in the data base included all types of discharges, we could expect only 14 percent of the discharges from the sample hospitals to be pediatric discharges.
- The sample distribution of university hospitals with pediatric residencies and of nonuniversity hospitals with pediatric residencies should approximate the distribution of discharges for teaching hospitals by census region and pediatric-dedicated bed size. The sample distribution of the urban hospitals without pediatric residencies and rural hospitals without pediatric residencies should approximate the distribution of discharges for nonteaching hospitals by census region and pediatric-dedicated bed size.

The sampling rate was established from these criteria, resulting in a rate of 23.7 percent for teaching discharges and a rate of 19.6 percent for nonteaching discharges. (Details of the sampling procedure are available from the authors on request.) This resulted in the following samples:

- 235,286 discharges from 34 children's hospitals (sample A).
- 56,715 discharges from 15 hospitals identified as university owned and affiliated with a pediatric residency program (sample B).
- 27,616 discharges from 10 hospitals identified as nonuniversity owned or affiliated with a pediatric residency program (sample C).
- 116,721 discharges from 130 hospitals identified as urban hospitals (located in a metropolitan statistical area) (MSA) without a pediatric residency program (sample D).
- 54,073 discharges from 97 hospitals identified as rural hospitals without a pediatric residency program not located in an MSA (sample E).

In general, the sample of discharges from university hospitals with pediatric residency programs and from nonuniversity hospitals with pediatric residency programs compared favorably with the distribution of pediatric discharges for all U.S. teaching hospitals. The sample of discharges from urban hospitals without pediatric residency programs and rural hospitals without pediatric residency programs compared favorably with the distribution of pediatric discharges for all U.S. nonteaching hospitals. (These comparisons are available from the authors on request.)

Analytical procedures

Having identified five mutually exclusive groups of hospitals, the first objective of this research was to analyze their differences (or similarities) on six measures of resource intensity. Major diagnostic category, diagnosis-related group, disease stage, average length of stay, average charges, and expected severity were included as measures of resource intensity in six separate analyses.

The chi-square test of independence (or lack of statistical association) formed the basis of the first three analyses, with the appropriate statistics for measuring the strength of the association. In comparing the average length of stay and average charges of the five hospital groups, a one-way analysis of variance (ANOVA) was performed.

The second objective of this research was to evaluate the ability of the DRG classification system to explain the variance in resource consumption and to compare that with a revised DRG classification system developed in this work. Charges and length of stay were included as proxy measures for expected resource intensity, or the vector of resources, that each patient is expected to consume during his or her hospital stay. Disease stage (Gonella, Louis, and McCord, 1976) was included because of its potential implications for the cost of patient care.

With each of the three criteria listed above serving as the dependent variable and hospital groups and DRG classification categories serving as independent variables, similar separate analyses were performed. A nested (hierarchical) ANOVA was perfomed to determine the amount of variance in charges, length of stay, or disease stage that the DRG classification system explains for a hospital group.

Using DRG classification as the independent variable, a one-way ANOVA was performed for each hospital to determine the proportion of variance explained by the DRG classification system. The resulting estimates for each hospital were used as the dependent variable in a one-way ANOVA that incorporates hospital group as the independent variable. Adjustments were made that took into account the hospital's contribution to sample size and the number of hospitals included in the classification. The strength of the relationship between the amount of the variance explained by DRG's and hospital group was evaluated by the Eta^2 statistic. Separate comparisons of pairs of hospital groups were made, using the Scheffe Post Hoc Test.

In order to evaluate the ability of a revised classification system to explain the variance in the resource variables, it was decided to select specific DRG's and apply the revised classification system within DRG's. In this manner, if the classification refinement explained an additional amount of variation, it could be considered an improvement on the DRG classification system.

Sixty-one DRG's were selected for this part of the analysis.[1] Several methods of classification within DRG's were evaluated but, in the interest of brevity, only one is reported here.[2] The National Association of Children's Hospitals and Related Institutions' (NACHRI) age categories is a classification system that is readily adaptable to the existing DRG system. Given its ease of application to the current system and its equally favorable results to the other classification refinements systems used in this work, the NACHRI age categories is the only refinement to DRG's presented in this article. The NACHRI age categories are as follows:

- Under 1 month.
- 1 month to under 1 year.
- 1-5 years.
- 6-12 years.
- 13 years or over.

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[1] Twenty-four DRG's appeared in the top 50, by patient volume, for both discharges from children's hospitals and total patient discharges. Twenty-six DRG's were the remaining DRG's in the top 50 of children's hospitals' discharges only. Six DRG's were in the top 50 of total patient discharges only and 5 DRG's were selected as being potentially unique to children's hospitals.

[2] Principal diagnosis, principal procedure, presence of comorbidity or complications, and disease stage were also evaluated as possible refinements of the DRG classification system.

Table 1
Percent distribution of patients in major diagnostic categories, by hospital group

Major diagnostic category	Hospital group A	B	C	D	E
	Percent distribution				
Total	100	100	100	100	100
1 Diseases and disorders of the nervous system	11	9	7	6	6
2 Diseases and disorders of the eye	3	3	2	2	1
3 Diseases and disorders of the ear, nose, and throat	12	7	10	19	16
4 Diseases and disorders of the respiratory system	12	8	9	11	17
5 Diseases and disorders of the circulatory system	5	6	2	1	1
6 Diseases and disorders of the digestive system	14	11	13	16	18
7 Diseases and disorders of the hepatobiliary system and pancreas	1	1	0	1	0
8 Diseases and disorders of the musculoskeletal system and connective system	10	9	8	9	7
9 Diseases and disorders of the skin, subcutaneous tissue, and breast	3	3	3	3	3
10 Endocrine, nutritional, and metabolic diseases and disorders	4	5	2	1	2
11 Diseases and disorders of the kidney and urinary tract	4	3	2	3	3
12 Diseases and disorders of the male reproductive system	2	2	2	2	2
13 Diseases and disorders of the female reproductive system	0	0	1	1	1
15 Newborns and other neonates with conditions originating in the perinatal period	5	19	29	17	14
16 Diseases and disorders of the blood and blood-forming organs	3	2	1	1	1
17 Myeloproliferative diseases	3	3	1	0	0
18 Infectious and parasitic diseases	2	2	2	3	3
19 Mental diseases and disorders	1	2	1	1	1
20 Substance use and substance induced organic mental disorders	0	0	0	1	0
21 Injury, poisoning, and toxic effects of drugs	3	2	3	2	3
22 Burns	1	1	1	0	0
23 Factors influencing health status and other contacts with health services	1	2	1	0	1

NOTES: $X^2 = 92.955$; degrees of freedom = 21; and $W = .8857$. The 5 hospital groups are as follows:
Group A is children's hospitals.
Group B is university hospitals with pediatric residency programs.
Group C is nonuniversity hospitals with pediatric residency programs.
Group D is urban hospitals without pediatric residency programs.
Group E is rural hospitals without pediatric residence programs.

With each of the 61 DRG's, a separate one-way ANOVA was performed with age level serving as the independent variable and average length of stay (ALOS) as the dependent variable. This was repeated with average charge as the dependent variable, with both series of analyses being separately conducted in each of the five hospital groups.

Results

Throughout these analyses, when the five hospital groups are included, the following designation applies:

- Group A = Children's hospitals.
- Group B = University hospitals with pediatric residency programs.
- Group C = Nonuniversity hospitals with pediatric residency programs.
- Group D = Urban hospitals without pediatric residency programs.
- Group E = Rural hospitals without pediatric residency programs.

Throughout the remainder of this article we will refer to patient populations although the study addresses only the relevant pediatric patient population.

The comparison of patients for the five hospital groups by 22 of the 23 major diagnostic categories (MDC's) used in this article is shown in Table 1.

This analysis was completed in a manner that evaluated the ranking of each MDC by the five hospital groups. If each MDC tended to be ranked (in terms of percent of patients) similarly by all five hospital groups, the Kendall's Coefficient of Concordance (*W*) would be close to unity (1.0). A coefficient of $W = .886$ indicates that the variance between MDC's is almost as great as total variance, thereby indicating that the five hospital groups were remarkably similiar with respect to the type of patients they treated.

It is shown in Table 2 that when all possible $\binom{5}{2}$, or 10-paired comparisons, were examined for a possible relationship, all Spearman's Rank Order Correlation (r_s) coefficients were in excess of .73, with the average r_s being .86. This confirms that all five hospital groups were remarkably similar in terms of the distribution of patients across MDC's.

The distribution of patients in the five hospital groups were next compared by diagnosis-related groups (DRG's). The distribution of patient volumes by DRG for the top 20 DRG's in all of the five hospital groups is shown in Table 3. For convenience,

Table 2

Correlation (r_s) between sample major diagnostic category volumes

	Sample				
Sample	A	B	C	D	E
A		.9551	.8851	.7572	.7820
B			.8568	.7365	.7518
C				.9447	.9560
D					.9763
E					

NOTES: Average r_s is .8566. See discussion of samples under Methodology.

Table 3

Percent of patients in diagnosis-related groups, by hospital group and rank order

	Hospital group									
	A		B		C		D		E	
Rank	DRG	Percent	DRG	Percent	DRG	Percent	DRG	Percent	DRG	Percent
Total	—	44.6	—	47.9	—	61.2	—	63.0	—	69.6
1	98	6.7	390	6.0	390	11.1	60	7.8	184	10.7
2	184	5.8	389	4.7	389	8.4	184	7.7	98	8.7
3	60	3.0	98	4.3	184	6.2	390	6.9	91	7.8
4	26	2.8	184	4.2	98	4.4	98	5.8	390	6.1
5	91	2.6	385	2.9	91	3.1	91	4.7	70	5.6
6	163	2.0	26	2.4	385	2.7	389	4.5	60	4.9
7	298	2.0	298	2.2	60	2.7	70	3.2	389	3.4
8	468	2.0	387	2.1	388	2.6	58	3.0	422	2.8
9	41	1.9	163	2.1	70	2.6	422	2.1	163	2.1
10	58	1.7	386	2.1	387	2.5	167	2.0	26	2.0
11	70	1.7	468	2.0	386	2.0	62	1.9	58	1.9
12	422	1.6	125	2.0	422	1.8	385	1.9	167	1.9
13	385	1.6	91	1.7	26	1.8	26	1.8	385	1.8
14	125	1.6	388	1.6	163	1.7	163	1.7	33	1.7
15	3	1.5	405	1.4	451	1.5	388	1.6	451	1.7
16	451	1.3	410	1.3	167	1.3	33	1.6	322	1.5
17	396	1.2	3	1.3	62	1.3	451	1.3	398	1.5
18	405	1.2	70	1.2	298	1.2	55	1.3	62	1.2
19	55	1.2	60	1.2	467	1.1	222	1.1	282	1.1
20	62	1.2	422	1.2	468	1.1	322	1.1	71	1.0

NOTES: $X^2 = 1{,}993.09$; degrees of freedom = 448; and *W* is .8898. DRG is diagnosis-related group. Data are for the top 20 DRG's only. The 5 hospital groups are as follows:
Group A is children's hospitals.
Group B is university hospitals with pediatric residency programs.
Group C is nonuniversity hospitals with pediatric residency programs.
Group D is urban hospitals without pediatric residency programs.
Group E is rural hospitals without pediatric residency programs.

only the top 20 DRG's are given in Table 3, but the test of the difference (or similarity) of distributions is calculated on the whole set of DRG's represented in the data.

The Kendall's Coefficient of Concordance (W = .890) indicates that the distribution of patients by DRG is remarkably similar for all five hospital groups.

When all 10 possible comparisons are made, all of the rank order correlation coefficients exceed .74, with an average r_s of .86. This confirms that all five hospital groups were remarkably similar in terms of the distribution of patients across all DRG's (Table 4).

Table 4
Correlations (r_s) between sample diagnosis-related group volumes

	Sample				
Sample	A	B	C	D	E
A		.9194	.8762	.7953	.7471
B			.9304	.8808	.8200
C				.9381	.8919
D					.9587
E					

NOTES: Average r_s = .8622. See discussion of samples under Methodology.

The frequency distributions of patients in the five hospital groups were next compared by stage of disease. The disease staging methodology was modified and employed to classify all patients in this study. Stages 1 through 4 (without death) represent increasing levels of disease severity and stage 5 includes all deaths. The distribution of patients in the five disease stages for all five hospitals groups is shown in Table 5.

The contingency table analysis shows a statistically significant large X^2 value, indicating a relationship between hospital group and disease stage. However, statistical significance is easily attained with such a large number of subjects (N), so a measure of the strength of the relationship is required. Cramer's V is a measure that can take on the value of 0 when no relationship exists and +1 when the two variables are perfectly related. The Cramer's V in this analysis is 0.0773, indicating that there is very little relationship between hospital group and disease stage. This is an indication that hospital groups do not differ relative to the disease level of their patients. That is to say, all hospital groups have approximately the same patient mix with respect to severity of illness.

A more intuitive measure of this similarity of hospital groups is provided in the uncertainty coefficient. This measure reflects the amount of uncertainty removed in the probability of finding a patient in a specific disease stage given that we know the hospital group that patient is in. The measure can take on a value of 0 if no uncertainty is eliminated and 1 if all uncertainty is eliminated. An uncertainty coefficient of 0.0174 in this analysis indicates that knowing the hospital group to which a patient belongs reduces the uncertainty of predicting the disease stage of the patient by only 1.7 percent. This, then, is a further indication of the similarity of the distributions of patients in the disease stages for the five hospital groups.

The five hospital groups were next evaluated in terms of LOS and charges. The results for LOS are given in Table 6, and the results for charges are given in Table 7. For both average length of stay (ALOS) and average charges (AC's), there was a statistically significant difference between hospital groups. The very large N was probably responsible for this. When we consider the Eta^2 coefficient, it can be seen that only two-tenths of 1 percent of the variance in ALOS and one-tenth of 1 percent of the variance in AC is explained by hospital group. This can be interpreted as an indication that there is no important difference in the ALOS or AC of the five hospital groups.

The proportion of each hospital group's total patients appearing in each of the five disease stages was compared in Table 5. A more sensitive measure of the overall severity level of a given patient population, however, is the proportion of patients within each DRG that appears in stage 3 or above.

Table 5
Number and percent distribution of patients in disease stages, by hospital group

	Hospital group									
	A		B		C		D		E	
Disease stage	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution
1	168,291	71.2	42,311	74.8	22,434	81.3	96,176	82.4	44,458	82.2
2	39,372	16.8	7,786	13.8	3,495	12.7	16,100	13.8	7,765	14.4
3	24,549	10.5	5,115	9.0	1,191	4.3	3,814	3.3	1,606	3.0
4	246	0.1	51	0.1	12	0.0	9	0.0	2	0.0
5	3,355	1.4	1,311	2.3	466	1.7	596	0.5	233	0.4

NOTES: X^2 = 11,711.6619; degrees of freedom = 16; Cramer's V = 0.0773; and uncertainty coefficent = 0.0174. Disease stages 1 through 4 represent increasing levels of disease severity, and stage 5 represents death. The 5 hospital groups are as follows:
Group A is children's hospitals.
Group B is university hospitals with pediatric residency programs.
Group C is nonuniversity hospitals with pediatric residency programs.
Group D is urban hospitals without pediatric residency programs.
Group E is rural hospitals without pediatric residency programs.

This measure can then be used to form an index by comparing it to the proportion of patients in stage 3 or above in the total data set.

An Expected Patient Severity Index was constructed for each hospital by taking the proportion of the individual hospital's patients in stage 3 or above of the disease staging classification, within DRG, relative to the proportion of patients in stage 3 or above in the overall data set. The higher the value of the index, the more resources the patient population is expected to consume. It is shown in Table 8 that the mean Expected Patient Severity Index for the five hospital groups is statistically significantly different. The Eta^2 (0.6170) indicates that 62 percent of the variance in severity index is explained by the hospital group. In addition to this, the R (−0.754) indicates a strong negative linear relationship. There is strong evidence, therefore, that when using this more sensitive measure of overall disease level, the patient population of children's hospitals appears more resource intensive than patient populations of the other hospital groups.

Further specification of the difference in resource intensity is possible by considering the 10 possible paired comparisons. In terms of resource intensity, the patient populations of children's hospitals and university hospitals are not statistically significantly different (Table 9). However, the patient populations of the other three hospital groups differ significantly from the patient populations of both children's hospitals and university hospitals. These results suggest that the five hospital groups might be viewed as two groups with respect to patient severity level. Children's hospitals and university hospitals with pediatric residencies would form one group and all other hospitals in the study falling into the other group.

The second objective of this study was to evaluate the ability of the DRG classification system to explain variance in resource variables. LOS, charges, and stage of disease were the resource variables incorporated in this part of the study. A two-stage analysis was used.

In the first stage, for each hospital, a one-way ANOVA was performed with LOS serving as the dependent variable and DRG's serving as the independent variable. From this, the amount of explained variance was determined for each hospital. (In the interest of clarity and brevity, these individual results are not reported here.) In the second stage, the amount of explained variance for each hospital was then incorporated as the dependent variable in a one-way ANOVA that included hospital group as the independent variable.

Table 6

Analysis of variance results for length of stay, by hospital group

Hospital group	Mean	Standard deviation	Number
A	5.6821	8.7127	235,286
B	7.2296	10.8785	56,715
C	5.8527	9.2312	27,616
D	4.0333	5.4911	116,721
E	3.6933	3.9594	54,073

NOTES: F = 2,272.398; degrees of freedom = 4; and Eta^2 = .002.
The 5 hospital groups are as follows:
Group A is children's hospitals.
Group B is university hospitals with pediatric residency programs.
Group C is nonuniversity hospitals with pediatric residency programs.
Group D is urban hospitals without pediatric residency programs.
Group E is rural hospitals without pediatric residency programs.

Table 7

Analysis of variance results for charges, by hospital group

Hospital group	Mean	Standard deviation	Number[1]
A	$3,553.63	$7,024.95	163,151
B	4,506.82	8,380.07	20,168
C	3,179.07	6,962.98	10,046
D	1,444.87	3,104.44	33,058
E	986.28	1,038.49	11,597

[1] Number does not agree with number for Table 6 because charge data was not available for all discharges.

NOTES: F = 1,235.218; degrees of freedom = 4; and Eta^2 = .001.
The 5 hospital groups are as follows:
Group A is children's hospitals.
Group B is university hospitals with pediatric residency programs.
Group C is nonuniversity hospitals with pediatric residency programs.
Group D is urban hospitals without pediatric residency programs.
Group E is rural hospitals without pediatric residency programs.

Table 8

Analysis of variance results for Expected Patient Severity Index, by hospital group

Hospital group	Mean	Standard deviation	Number[1]
A	1.6975	0.4320	137
B	1.5406	0.4138	33
C	0.7927	0.1132	16
D	0.7375	0.2514	69
E	0.7761	0.1554	32

[1] Number for each group reflects the adjustment.

NOTES: F = 113.179; degrees of freedom = 4; and Eta^2 = 0.6170; R = −0.7540.
The 5 hospital groups are as follows:
Group A is children's hospitals.
Group B is university hospitals with pediatric residency programs.
Group C is nonuniversity hospitals with pediatric residency programs.
Group D is urban hospitals without pediatric residency programs.
Group E is rural hospitals without pediatric residency programs.

Table 9

Paired comparisons for Expected Patient Severity Index, by hospital group

	Hospital group				
Hospital group	A	B	C	D	E
A		ns	*	*	*
B			*	*	*
C				ns	ns
D					ns
E					

NOTES: * is significant at 1-percent level; ns is not significant at 1-percent level. The 5 hospital groups are as follows:
Group A is children's hospitals.
Group B is university hospitals with pediatric residency programs.
Group C is nonuniversity hospitals with pediatric residency programs.
Group D is urban hospitals without pediatric residency programs.
Group E is rural hospitals without pediatric residency programs.

This procedure was repeated for both charges and stage of disease; results are shown in Tables 10, 11, and 12.

From the Mean column in Table 10, it can be seen that the DRG classification, on average, explains less of the variance in LOS in children's hospitals than it does in the other hospital groups. This means that DRG's are less homogeneous in terms of LOS in children's hospitals. The difference in means is statistically significant, and hospital group can be considered a strong predictor of the amount of variance in LOS explained by DRG's (Eta^2 = .45). It can also be seen that, with the exception of group D, there is a monotonic increase in the amount of variance explained as one moves from children's hospitals to rural hospitals. This linear relationship is reflected in R = .62 and can be considered strong.

From Table 11 it can be seen that the DRG classification explains less of the variance in charges in children's hospitals than it does in urban hospitals and rural hospitals. However, it explains even less of the variance for university hospitals with a pediatric residency program and for nonuniversity hospitals with a pediatric residency program.

The difference in means is statistically significant, and hospital group can be considered a good predictor of the amount of variance in charges explained by DRG (Eta^2 = .35). It can also be seen that there is a suggestion of a monotonic increase in the amount of explained variance as one moves from children's hospitals to rural hospitals. This linear relationship is reflected in R = .50 and can be considered reasonably strong.

The DRG classification explains less of the variance in disease stage in children's hospitals than it does in the other hospital groups (Table 12). The difference in means is statistically significant, although hospital group is not a strong predictor of the amount of variance in disease stage explained by DRG's (Eta^2 = .10). The linear relationship between hospital group and the amount of explained variance in disease stages is not nearly so strong in this analysis (R = .22).

Knowing the group to which a hospital belongs allows us to make reasonable predictions regarding the homogeneity of DRG's in terms of ALOS and average charges. That is to say, knowing that a hospital belongs to group A, we can predict that DRG's will be less homogeneous with respect to ALOS for that hospital than they will, generally, for hospitals in the other groups. Similar predictions can be reasonably made for average charges (DRG's for group B hospitals are less homogeneous), but no reasonable predictions can be made for disease stage.

Table 10

Variance explained by diagnosis-related groups in length of stay, by hospital group

Hospital group	Mean	Standard deviation	Adjusted number
A	.3237	.0553	138
B	.3356	.0440	33
C	.3837	.0629	16
D	.4923	.1116	68
E	.4470	.1231	32

NOTES: F = 57.365; degrees of freedom = 4; Sig = <.01; Eta^2 = .4495; and R = .6185. The 5 hospital groups are:
Group A is children's hospitals.
Group B is university hospitals with pediatric residency programs.
Group C is nonuniversity hospitals with pediatric residency programs.
Group D is urban hospitals without pediatric residency programs.
Group E is rural hospitals without pediatric residency programs.

Table 11

Variance explained by diagnosis-related groups in charges, by hospital group

Hospital group	Mean	Standard deviation	Adjusted number
A	.3591	.0590	70
B	.3304	.0689	9
C	.3258	.0502	4
D	.5156	.1485	14
E	.4838	.1683	5

NOTES: F = 13.291; degree of freedom = 4; Sig = <.01; Eta^2 = .3540; and R = .4981. The 5 hospital groups are as follows:
Group A is children's hospitals.
Group B is university hospitals with pediatric residency programs.
Group C is nonuniversity hospitals with pediatric residency programs.
Group D is urban hospitals without pediatric residency programs.
Group E is rural hospitals without pediatric residency programs.

Table 12

Variance explained by diagnosis-related groups in disease stage, by hospital group

Hospital group	Mean	Standard deviation	Adjusted number
A	.3449	.0450	138
B	.3887	.0813	33
C	.4145	.1124	16
D	.3932	.0931	68
E	.3704	.0978	32

NOTES: F = 7.494; degrees of freedom = 4; Sig = <.01; Eta^2 = .0964; and R = .2236. The 5 hospital groups are as follows:
Group A is children's hospitals.
Group B is university hospitals with pediatric residency programs.
Group C is nonuniversity hospitals with pediatric residency programs.
Group D is urban hospitals without pediatric residency programs.
Group E is rural hospitals without pediatric residency programs.

Further specificity of these three sets of results is possible by comparing each group, separately, with all the other groups; results are shown in Tables 13, 14, and 15.

Generally speaking, the homogeneity of DRG's with respect to ALOS and average charges is very similar for children's hospitals, university hospitals with pediatric residencies, and nonuniversity hospitals with pediatric residencies. Urban hospitals and rural hospitals also appear very similar to each other but different to the other three groups on these measures. The homogeneity of DRG's in terms of disease stage is similar for all groups, with the exception of children's hospitals.

The extent to which NACHRI age categories explained variance in charges and LOS beyond that attributable to DRG was examined next. It is suggested that age categories are associated with different levels of resource requirement within DRG's and, therefore, would add to the explanatory strength of DRG's.

Within each of the 61 selected DRG's, for each hospital group, two separate ANOVA's were performed: The NACHRI age categories served as the independent variable in both sets of analyses, with charges serving as the dependent variable in one set and LOS serving as the dependent variable in the other set.

The individual results are not reported here, but they are available from the authors on request. These results show that an additional 5 percent, or more, of the variance in charges and LOS was explained in 35 of the 61 DRG's.

These results indicate that the NACHRI age categories, used as a refinement of DRG's, are somewhat successful. It appears to be particularly true of DRG's 55, 74, 109, 125, 156, 163, and 222; but, of these, only DRG 163 appears in the top 20 DRG's by patient volume of all five hospital groups (Table 2). The results also indicate that, generally, the NACHRI age categories are less successful in explaining additional variance in the children's hospitals than in the other hospital groups.

Table 13

Paired comparisons for variance explained in length of stay by hospital group

	Hospital group				
Hospital group	A	B	C	D	E
A		ns	ns	*	*
B			ns	*	*
C				*	ns
D					ns
E					

NOTES: * is significant at 1-percent level; ns is not significant at 1-percent level. The 5 hospital groups are as follows:
Group A is children's hospitals.
Group B is university hospitals with pediatric residency programs.
Group C is nonuniversity hospitals with pediatric residency programs.
Group D is urban hospitals without pediatric residency programs.
Group E is rural hospitals without pediatric residency programs.

Table 14

Paired comparisons for variance explained in charges, by hospital group

	Hospital group				
Hospital group	A	B	C	D	E
A		ns	ns	*	ns
B			ns	*	ns
C				*	ns
D					ns
E					

NOTES: * is significant at 1-percent level; ns is not significant at 1-percent level. The 5 hospital groups are as follows:
Group A is children's hospitals.
Group B is university hospitals with pediatric residency programs.
Group C is nonuniversity hospitals with pediatric residency programs.
Group D is urban hospitals without pediatric residency programs.
Group E is rural hospitals without pediatric residency programs.

Table 15

Paired comparisons for variance explained in disease stage, by hospital group

	Hospital group				
Hospital group	A	B	C	D	E
A		ns	ns	*	ns
B			ns	ns	ns
C				ns	ns
D					ns
E					

NOTES: * is significant at 1-percent level; ns is not significant at 1-percent level. The 5 hospital groups are as follows:
Group A is children's hospitals.
Group B is university hospitals with pediatric residency programs.
Group C is nonuniversity hospitals with pediatric residency programs.
Group D is urban hospitals without pediatric residency programs.
Group E is rural hospitals without pediatric residency programs.

Summary and conclusions

When the five hospital groups are compared in terms of distribution of patients by MDC, DRG, and stage of disease (Tables 1, 3, and 5), there do not appear to be any important differences. When LOS and charges are considered (Tables 6 and 7), the amount of variance explained by hospital group is two-tenths of 1 percent for LOS and one-tenth of 1 percent for charges, indicating again no important difference. However, the correlation coefficients of MDC volumes (Table 2) and DRG volumes (Table 4) suggest that children's hospitals (group A) are very similar to university hospitals with pediatric residency programs (group B) (r_s = .96 and .92) and nonuniversity hospitals with pediatric residency programs (group C) (r_s = .89 and .88), but not so similar to urban hospitals without pediatric residency programs (group D) (r_s = .76 and .80) and rural hospitals without pediatric residency programs (group E) (r_s = .78 and .75). The LOS means (Table 6) and charge means (Table 7) also support this contention. The Expected Patient Severity Index analysis provides strong evidence that the resource intensity of the patients in children's hospitals and university hospitals with pediatric residency programs is greater than that of the patients of the other three hospital groups.

It would appear from this study that specialty hospitals such as children's hospitals and teaching hospitals tend to attract similar patient populations with similar resource intensities. This would argue for special consideration for both of these hospital types in reimbursement policy. This is not to suggest that the reimbursement rate for children's hospitals should include the teaching adjustment. Rather it suggests that the two rates be similar before the teaching adjustment is added to the teaching hospitals.

The second part of this research evaluated the ability of DRG's to explain the variance in resource variables. The findings indicate that, when the current DRG patient classification system is applied to pediatric patients, the resulting groups of patients are less homogeneous with respect to resource intensity in children's hospitals than in the other four hospital groups studied (Tables 10 and 12). With greater variation in terms of resource requirements, within DRG, the predetermined, fixed reimbursement level under the PPS is less equitable.

Any patient classification system used as the basis for reimbursement must have the capability of capturing patients of the same resource intensity within the same group. It is recognized that in the development of DRG's some minor adjustments were made to improve medical meaningfulness. This work provides support for the argument that DRG's do not serve their purpose well in patients of children's hospitals or in the pediatric patients of the other hospitals studied here. At best, less than 50 percent of the variance in the resource variables included in this work, is explained by the DRG classification. This would suggest that some other classification system, or a modification of the DRG system, might better apply to pediatric patients.

A simple modification of DRG's was developed with the NACHRI age categories being used to further classify patients within DRG. The capability of this revised classification system to explain variance in the resource variables beyond that explained by DRG's was examined. Such a modified DRG classification has the advantage of being readily available and easily applied.

The results indicate that a simple modification such as introducing NACHRI age categories into the DRG system adds somewhat to the integrity of the classification system for pediatric patients. The current DRG classification system does allow for the possible difference in resource intensity of patients of different age groups with the same principle diagnosis. It would not, therefore, be undermining the basic methodology of the system to incorporate age grouping in the classification of younger patients. As discussed in this article, this modification is simple to apply, and the findings of this research are encouraging enough to suggest further research using DRG's modified by the age grouping of pediatric patients.

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The economics of information exchange: Medicaid in Wisconsin

by Ralph Andreano, Eugene Smolensky, and Thomas Helminiak

In Medicaid, as in all third-party insurance, there are significant costs for information exchange between providers of services and the State (or other insurer), which reimburses those providers. On the basis of a study of Medicaid in Wisconsin, this article indicates that appreciable costs are incurred owing to deficiencies in information exchange between these parties. It is proposed that the costs of automated interventions, which could improve information exchange, be compared with the existing costs of the present system of information exchange.

Introduction

This study grew out of one of the author's long interest in, and experience with, administration of Wisconsin's Medicaid program. It seemed that Medicaid and, to a greater extent, all third-party health insurance contained such discontinuities in information receipt and transmittal that the system must be generating costs to some and conferring benefits to others. We thought, as did others familiar with Medicaid, that Medicaid was costly to administer because it has a rapid turnover of eligibles and a complex set of benefits and payment policies; its dependence on the exchange of paper documents seemed to make matters worse. Our intuitive view, therefore, was that further automating the Medicaid system would surely reduce administrative costs and smooth the discontinuities of information exchange among all the key actors. The costs of information exchange found in Medicaid could, we felt, also be indicative of what might be found in other insurance programs. By focusing on Medicaid in Wisconsin (which we describe as a "best practice" State), we would be able to make some generalizations applicable to all Medicaid programs.

Information exchange: Providers and administrators

This study concerns the benefits and costs of information exchange between providers of services and payers of services. After considering a broad range of information exchange relating to Medicaid, including exchanges between various government agencies associated with Medicaid (the State legislature, administrative bureaus, and the fiscal agent), as well as State-recipient communications, we decided to focus on information exchange between the State administrators and the health care providers. A preliminary review suggested that the State-provider nexus constituted the area of greatest volume of information exchange, with perhaps the greatest national applicability. Because information exchange between service providers and payers is not perfect or simultaneous, costs and benefits are generated by the transfers. The counterfactual that guided this study was the following: What are the costs and benefits of deficient information, weighed against what those costs and benefits would be if information exchange were "perfect"? Of equal interest was the following: What automation would displace what costs, pushing these costs closer to what they would have been if information exchange were perfect?

Costs resulting from imperfect information may represent any of three situations:

- Some parties may bear unintended costs, while other parties obtain associated unintended benefits.
- Costs may be shifted from one party to another.
- There may be net (dead weight) costs to the system as a whole.

For example, because of information imperfections, providers may render services that they mistakenly expect will be reimbursed by Medicaid. Had a situation of perfect information exchange existed, would the providers still have rendered the services, and would the services then be reimbursed by Medicaid? Perfect information exchange might either cause providers to recognize the impossibility of receiving payment for a service rendered, or it might allow them to understand how to obtain Medicaid reimbursement: by following certain procedures or supplying certain information required for reimbursement. In the former case (reimbursement not possible), the provider must decide whether he or she is nevertheless willing to render the service without reimbursement. If the counterfactual of perfect information exchange means that the service is not given, then, under imperfect information exchange, we find the generation of an unintended benefit (to the services recipient) and an unintended cost (to the nonreimbursed provider). Alternatively, if the counterfactual of perfect information exchange would allow the provider to render the service and to be reimbursed by Medicaid, then under imperfect information exchange there is a cost transfer from the State (which avoids reimbursing the provider) to the provider (who loses reimbursement). Finally, regardless of which counterfactual applies, we expect to find net system costs reflecting imperfect information exchange between the administrative efforts of the provider in (unsuccessfully) attempting to obtain reimbursement and the administrative efforts of the State in processing the (ultimately rejected) provider reimbursement requests.

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Thus, automated system interventions, designed to produce more perfect information exchange, may result in the following:

- Reduction of the incidence of unintended costs and benefits to parties receiving them.
- Alteration of the current pattern of cost-shifting.
- Reduction of the net deficient information costs in the system.

To assess the viability of a potential intervention that would improve information exchange, we need to know both the reduction in the magnitude of the costs of imperfect information exchange and the altered pattern of costs and benefits within the system. The decision to implement such an intervention and the operating costs of such an intervention will undoubtedly involve perceptions of shifted costs and benefits. We offer some estimates of the overall magnitude of reduced imperfect information exchange costs in Medicaid, and tentatively explore the division of the costs among the system's separate categories and parties.

We designated five information functions, separate areas of information exchange, from start of service to receipt of payment by the provider: (1) recipient certification; (2) program benefits policy; (3) providers' claims for reimbursement; (4) claims status advice; (5) payment to providers. We roughly organized our cost estimates according to these functions, and within each we distinguished "operating costs" and "costs resulting from deficient information." Although there is some arbitrariness in this classification, the principle is that operating costs are those associated with the information exchange officially prescribed by Medicaid policy; deficient information costs are those incurred because the official information exchange is imperfect (or not ideal). We give cursory attention to the operating costs within the five functions; instead, we emphasize the deficient information costs, because we presume that intervention technologies will offer benefits by reducing the deficient information costs rather than the operating costs. (As we shall see, the operating costs are, for the most part, quite small compared with the deficient information costs.)

Recipient certification

This information function refers to transfer of the information concerning services reimbursement from the recipient certification file (as maintained by the State or its fiscal agent) to providers of Medicaid services. This information concerns whether or not the recipient has basic eligibility for benefits, status of the recipient regarding the range of benefits that may be reimbursed, specific limitations on providers or services for a specific recipient, and the existence of other insurance coverage that must be billed before billing Medicaid.

In Wisconsin, as in most other States, the primary process for transmitting this information involves the production by the State of a paper Medicaid identification (ID) card. In Wisconsin (also as in most other States), the paper ID cards are printed monthly and mailed, near the end of the previous month, to all recipients granted eligibility for the next month. Thus, both continuing and new recipients receive a card every month that extends eligibility only through the next month. Providers of services have the responsibility of checking the recipients' cards on each visit to ascertain current eligibility as well as other information derived from the recipient certification file.

States differ in the amount of basic eligibility information that providers are required to obtain from the cards and enter on their claims for services reimbursement. Some States (including Wisconsin) require that the recipient's name be accurately copied, with correct spelling, in addition to the correct ID number, and that his or her sex and date of birth also be entered correctly. Some States only require that the correct ID number be entered on the claim. Normal operating costs of this system include the costs of the monthly production and mailing of the ID cards.

Problems with this system mostly derive from the fact that providers often fail to check the recipient ID card when services are rendered (because the recipient is not carrying the card, or the provider neglects to ask for it), or providers fail to transcribe accurately required information from the card. When this happens, providers may suffer losses because their claims for reimbursement are denied. (Where the problem is one of correct transcription of information onto the claim [or a procedural problem such as other insurance billing], reimbursement may be obtained on a subsequent resubmission of the claim.) Providers may attempt to verify required information by getting in touch with the recipient (after providing the service) or by phoning or writing one of the agencies with access to the recipient certification file. This adds administrative costs for both the providers and the contacted agencies. The provider also experiences costs when payment on claims is delayed, owing to problems concerning recipient certification; this causes staff resources to be employed for the completion of rejected claims.

The State experiences losses related to the costs of processing these rejected claims. It is also likely to suffer some losses as a result of the guarantee to providers that eligibility of a recipient will be treated as valid through the end date (normally end of the month) indicated on an ID card. In some cases (apparently relatively few in Wisconsin but more in some other States), after the ID card granting eligibility for the month has already been sent to recipients, certifying agencies determine that eligibility should not have been granted for that month. In these instances, according to what in Wisconsin is known as the "good faith" policy, providers continue to be reimbursed for services rendered during the eligibility period indicated on the card. Reimbursement for these services represents an additional cost to the States.

Program benefits

This information function, defined as information exchange from the State to Medicaid providers, concerns what services are reimbursable (including limitations and conditions for such reimbursement). The formal process involves printing and mailing provider handbooks (often differentiated for different groups of service providers and updated at various times by corrected handbook page inserts), provider bulletins, and letters to providers. In addition to learning about benefits policy, providers need to understand required billing policy, the rules governing the completion and submission of claims for reimbursement of rendered services. Although the information transfer process is rather similar for both benefits policy and billing policy, we have diverted discussion of the "problem costs" of billing policy into the third information function, providers' claims for reimbursement, discussed next; this was done because we presume that automated procedures for claims submission may be edited somewhat more readily for errors in billing policy than in benefits policy.[1]

Providers frequently provide services for which they anticipate Medicaid reimbursement, but which are not covered under the program and for which they consequently may not be reimbursed. Provider and State resources may also be expended when providers seek policy clarification by phoning or writing the State Medicaid agency. Further provider costs result from the delayed payment of claims that present benefits policy problems and the administrative expense of completing and submitting claims rejected for reasons of benefits policy. The State also bears the cost of processing these rejected claims. Potentially, there might be costs related to delays in notification of policy change resulting from printing and mailing lags. We judged these costs inconsiderable, at least for Wisconsin.

Providers' claims for reimbursement

To obtain reimbursement for services to Medicaid recipients, providers need to submit claims to the State Medicaid agency or its contracting fiscal agent. The claims must be submitted under prescribed formats (differing among various groups of services) and must follow various billing policy regulations. In most States, claims are predominantly submitted on paper, though most also accept claims on magnetic media (tapes or disks). In a few States, some claims are electronically submitted by the providers. Another possibility, in limited operation now, is for claims submitted on paper forms to be read by optical character scanners, reducing the data entry efforts of the claims-processing agent.

In the case of paper forms, operating costs of the present system include the production and mailing of the forms by the State, the completion and mailing of the forms by providers, and the entry of the claim-form data into the processing system. We excluded the operating costs of this system, from completed data entry to claims adjudication, because that operation is already highly automated. For magnetic media claims, operating costs are the claims completion and mailing costs.

Problem costs include provider losses of reimbursement for services when claims are rejected owing to filing policy problems. State and provider efforts related to attempts by providers to clarify filing policy by phone or written correspondence are another cost. In addition (as for the two preceding information functions), providers have costs owing to delayed reimbursement (as a result of filing problems) and administrative costs of filing claims rejected for these reasons. Again, the State faces the cost of processing these rejected claims.

Besides the delayed payment lags suffered by providers because of a provider error (related to either recipient certification, benefits policy, or claims filing policy), providers endure interest losses because of general submission lags (the time between the date of service [DOS] and the date the submitted claim is received by the fiscal agent) and processing lags (the time between claim receipt by the fiscal agent and adjudication). Compared with an ideal world, for the provider, in which payment is received immediately upon rendering services, these lags represent provider costs. (And they represent corresponding savings to the State.)

Claims status advice

The claims-processing agent issues statements to providers describing the adjudication status of their submitted claims. Printed and mailed to providers, these statements generally identify whether claims have been paid (indicating reason for payment cutback, if any), denied (indicating the reason for denial), or are still pending in the system. Normal operating costs include the printing and mailing costs of these claims status statements.

Problem costs of the present system include State and provider expenditures related to provider inquiries about claims status. Another cost involves the submission of duplicate claims by providers who ignore the fact that the claim either was previously paid or is still pending in the processing system. Duplicate claims submission entails both additional provider administrative cost (for submitting the duplicate claims) and additional State costs (for processing the duplicate claim submissions).

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[1] There is some blurring of this division in our actual cost estimations, however. Provider handbooks contain rules for both benefits policy and billing policy, but we have not attempted to separate these two sets of rules; both are included under the operating costs of the program benefits policy function.

Payment to providers

Provider payment for claims that are favorably adjudicated is effected completely in Wisconsin (and predominantly in most other States) by checks sent to providers through the mail. In Wisconsin, the lag between adjudication and payment involves the ordering and completion of the "checkwrite," the merging of the checks with the claims status advice statements, the mailing of checks to providers, and providers' depositing of the checks. (In some States, there is also a delay while the State reviews the proposed payment amounts to providers and the comptroller decides whether or not to release State funds from which the provider checks are drawn.)

The normal operating costs of this system are the printing and mailing costs of the provider checks. Compared with an ideal world, where provider payment is effected immediately upon favorable adjudication (or comptroller authorization of funds), such as might be obtained from electronic funds transfer, providers lose the interest value of the payment delay (and the State gains it).

Cost computations for Wisconsin Medicaid

Many of our cost estimates required obtaining information on losses related to claim rejections. The specific statistics we required were not available from routinely generated reports, nor could special reports be readily produced within our time and expenditure limitations. Consequently, a major effort of our study involved the generation of these statistics from a sample of several hundred rejected claims. We particularly sought estimates of the following:

- The annual volume and dollar amount of unique (not double-counted as a result of multiple submissions and multiple rejections) rejected claims.
- The percentage of the unique claim rejections that are ultimately paid on resubmission versus the percentage of those that are never paid.
- The appropriate valuation of the never-paid claims, in terms of the probable pricing cutback in these claims, had they been paid.
- The mean payment delay days for claims rejected one or more times, but ultimately paid.

To obtain these estimates, we tracked a stratified (by provider type) random selection of 371 claim rejections (337 full claim rejections, that is, all of one or more service billings on a single claim submission, and 34 partial rejections of multiple detail claims) through resubmission and readjudication experience. (A subsequent check confirmed the randomness of the sample.) These rejections include both what Wisconsin designates as claim "denials" and claim "returns." (The latter reflect detected claim errors or omissions at the entry stage of the adjudication process.)

Because Wisconsin has a 1-year submission deadline, the rejection sample was tracked over a 1-year period (actually 13 months) from date of service, during 1983-84, to identify possible resubmissions resulting in either further rejections or payments of the claims. For the tracking procedure, we employed on-line inquiry screens, microfiche records of claim adjudication advice statements supplied to providers, and computer-generated recipient claim histories. Claim rejection reasons (numbering about 500) were classified as denials and returns. Denials were further divided into the following categories:

- Recipient certification: missing or correctable information; recipient ineligible; primary provider violation; and bill other insurance carrier.
- Provider certification: missing or correctable information and other violation.
- Benefits policy: no benefit (general, no benefit for medical status, or conditions not met); limitations exceeded; not medically necessary; invalid criteria relationships; requires prior authorization (PA) always; requires PA beyond limits; PA conditions violated; late billing; and not separately or additionally payable.
- Missing or invalid claim data: general and PA number.
- Duplicate claim.

Returns were further divided into the following categories:

- Recipient certification: missing or correctable information.
- Provider certification: missing or correctable information.
- Missing or invalid claim data: general and PA number.

The estimated sample statistics were subsequently applied to the universe of all claim rejections (for calendar year 1983); the total quantity and dollar volume of these rejections were known from routinely produced Medicaid reports.

Our estimate of the costs of deficient information and operating costs are shown in Table 1. The following narrative provides some detail for each of the five areas of information exchange.

Recipient certification

Operating costs

The production cost of about 230,000 recipient ID cards printed each month is $77,500 per year. The annual mailing cost for these cards is $510,600. These and other operating cost data given in later sections were predominantly supplied by State sources (including State administrative agencies and fiscal agent) with some interpretational adjustments by us.

Table 1
Operating and deficient information costs, by information function: Calendar year 1983

Information function	Operating costs		Deficient information costs	
	State	Providers	State	Providers
	Estimated annual cost in thousands			
Total	$2,589.9	$407.3	$2,629.1	$72,476.3
Recipient certification				
Total	588.1	—	1,845.9	30,124.2
ID card production	77.5	—	—	—
ID card mailing	510.6	—	—	—
Reimbursement following eligibility termination	—	—	871.8	—
Request for verification of recipient certification	—	—	483.6	[1]643.0
Provider reimbursement loss	—	—	—	28,834.6
Delayed payment because of certification error	—	—	—	194.1
Processing of claim rejections	—	—	490.5	—
Submission of claims rejected	—	—	—	452.5
Program benefits policy				
Total	82.2	—	224.2	16,863.3
Provider handbooks	43.4	—	—	—
Provider bulletins	38.8	—	—	—
Policy change notification delays	—	—	—	—
Provider requests for policy clarification	—	—	45.8	49.1
Provider reimbursement loss	—	—	—	16,465.2
Delayed payment because of benefits policy error	—	—	—	194.8
Processing of claim rejections	—	—	178.4	—
Submission of claims rejected	—	—	—	154.2
Providers' claims for reimbursement				
Total	1,398.3	407.3	405.3	24,394.9
Forms production and mailing	296.7	—	—	—
Data entry	1,098.0	—	—	—
Postage for submitted claims	3.6	407.3	—	—
Providers' requests for filing policy clarification	—	—	198.5	128.1
Providers' reimbursement loss	—	—	—	12,852.6
Delayed payment because of filing error	—	—	—	333.3
General delayed payment lags:				
Billing	—	—	—	8,267.7
Processing	—	—	—	2,589.0
Processing of claim rejections	—	—	206.8	—
Submission of claims rejected	—	—	—	224.2
Claims status advice				
Total	439.0	—	153.7	71.7
Remittance advice:				
Printing	43.8	—	—	—
Mailing	395.2	—	—	—
Provider queries concerning claims status	—	—	15.4	9.9
Processing of duplicate claim rejections	—	—	138.3	—
Submission of claims rejected as duplicate	—	—	—	61.8
Payment to providers				
Total	82.3	—	—	1,022.2
Checks:				
Printing	8.2	—	—	—
Mailing	74.1	—	—	—
Payment transmittal lag	—	—	—	1,022.2

[1] The estimate of provider costs for verification of recipient certification excludes provider costs of getting in touch with recipients, which are believed to be considerable.

SOURCES: Data are estimated from State of Wisconsin Medicaid Management Administrative Reporting Subsystem reports; samplings of Medicaid claims histories; and interviews with Medicaid providers, staffs of recipient certification agencies, and State of Wisconsin Medicaid administrative staff.

Deficient information costs

Reimbursement following eligibility termination

We seek to estimate here the cost of reimbursed services delivered to recipients after the fiscal agent (which maintains the recipient certification file in Wisconsin) has received advice from the certifying agency that eligibility should have been canceled for that month. Provider reimbursement is made according to a "good faith" policy which acknowledges the full-month validity of the present paper Medical Assistance (MA) cards. Based on very restricted sample information, we estimated a monthly average of 1,668 late terminations of eligibility, granting a mean additional 21.43 days of eligibility for recipients whose mean monthly Medicaid expenditure per eligible was $61.83. Consequently, the cost of late terminations under the present system is an estimated $871,845 per year. Thus, a system giving providers daily updates on recipient certification might include such late eligibility termination costs among its benefits.

Verification of recipient certification

In Wisconsin, the possible sources of this verification include the fiscal agent, which has a toll-free provider access number; the Bureau of Health Care Financing (BHCF); the Bureau of Economic Assistance (BEA), which has a toll-free number and will provide eligibility information for Supplemental Security Income (SSI) Medicaid recipients; the certifying agencies (primarily the 72 counties, plus a few other agencies); and the actual Medicaid recipient to whom services were rendered.

We interviewed (in person or by phone) all of the relevant State agencies and a sample (reflecting responsibility for 59 percent of all Medicaid eligibles) of local agencies concerning number of staff hours devoted to handling provider queries (phone and written) on recipient certification. We also interviewed a small sample of providers. Our estimated cost for all State and local Medicaid agencies, including staff time plus phone and other equipment cost, is $483,600 annually. Our estimate of provider costs for making these recipient certification queries includes the time for expressing the query (on-phone time, estimated to be 3 minutes per call or writing time, both estimated from State agency data on incoming phone calls and written correspondence) plus an estimated equal amount of time for the provider to recognize the problem, formulate the query, and (particularly for toll-free numbers use) complete phone connections. Provider staff hours were multiplied by an estimated mean provider billing staff cost, salary plus fringe, of $8.10 per hour. The total estimated provider cost of the recipient certification queries to the government agencies is $643,000.

This leaves the cost of provider attempts to obtain, after services were rendered, the required certification information from the recipient. Time constraints resulted in a very small, probably unrepresentative, sample of provider interviews concerning this cost. Although this limited sample suggests that provider staff time for getting in touch with the recipients regarding their certification status is a considerable amount (possibly well exceeding all other correspondence costs in this area), we have not included any estimate of this cost in our tables.

Provider reimbursement loss

We based our estimates of these losses on statistics derived from our sample of tracked rejected claims and the associated procedures described earlier. For this estimation, claim rejections related to "Recipient certification" under "Denials," as listed earlier, were considered (however, the subcategory "bill other insurance carrier," was not included on the assumption that all of these rejections would be ultimately paid, either by the other insurance carrier or by Medicaid[2]).

Thus, we estimated the unique rejections, which are not paid on subsequent submissions, valued according to mean pricing cutback amounts, for the individual subcategories of recipient certification error. We found considerable variation among these subcategories, both in resubmission rates for initially rejected claims and in the proportion of initially rejected claims that are ultimately paid on resubmission. These variations seem to reflect differences in the extent to which rejected claims are potentially reimbursable, by supplying improved information on the claim form, or else are basically nonreimbursable because of recipient's ineligibility to receive (under Medicaid payment) a given service from a given provider. In our sample of tracked claims, we found, for example, that 71.3 percent of the initially denied claims in rejection subcategory "missing or correctable information" were eventually paid upon resubmission; however, only 2.3 percent of the initially denied claims in the "recipient ineligible" subcategory were eventually paid after resubmission. For those services which are basically nonreimbursable to a provider, even given perfect information on service provision and claims filing procedures, the provider may, in some instances, nevertheless decide to offer the services, out of ethical or charitable feelings, or with the hope that the recipient might personally make payment.

The estimated provider reimbursement losses should be discounted for those losses that would not be reduced with improved information. For this, we needed first to estimate the proportion of unique claim rejection amounts (not paid on resubmission and valued at estimated pricing cutback), by provider grouping, that probably would not be paid under conditions of perfect information.[3] To these amounts, we then applied our assumptions about the ethics or charity factors applicable to the provider groups. Given the heavy reliance on assumptions, we consider the estimation of these adjustments as rather weak. The net result of applying these adjustments is a reduction in the recipient certification loss amounts from $31,816,400 to the $28,834,600 shown in Table 1.

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[2] Some of these claims may be later denied by Medicaid (following the other insurance submission) for other rejection reasons. Thus, our failure to follow up these claims probably contributes to a downward bias in the cost estimates of our other rejection categories.

Delayed payment

These costs relate to the interest lost by providers because of denial of the initial claim for reimbursement, even though reimbursement was obtained on resubmission. We estimated that the aggregate delayed payments for the first three subcategories of "Recipient certification" were $17,710,300, and that the mean incremental delay is 50.3 days for these payments. At 8 percent simple interest, we obtain delayed payment costs of $194,100.

Processing recipient certification error

These are the State costs for processing claims rejected for recipient certification error. In this case, we include the subcategory "bill other insurance carrier." This subcategory is included because if providers had (and acted on) perfect information on other insurance billing requirements, submitted claims would not be rejected for this reason. Multiplying rejected claims volumes for each rejection category by the estimated fiscal agent cost of processing and rejecting claims in these categories results in an estimated annual cost to the State (based on 1983 rejection volumes) of $490,500.

Submission of claims rejected

Various situations contribute to this cost estimation: If the initial claim for services reimbursement by a provider is rejected, and the provider does not resubmit the claim, the cost is that of the original submission. If the provider's original claim submission and all subsequent resubmissions (which frequently represent corrections to photocopies of original submissions) are all rejected, the cost is the sum of the cost of the original submission plus the cost of all resubmissions. However, if payment is effected by one of the resubmissions, the cost is only the (incremental) cost of the resubmissions.

We estimated that the mean provider staff labor time for all aspects of an original claim submission was 15 minutes for a manually prepared claim; we estimated zero staff labor time for the original submission of a claim prepared by automatic data equipment; and we estimated that all resubmissions, regardless of whether the original was manually or automatically prepared, required 5 minutes of provider staff time.

The cost computations were performed utilizing the volume of rejections for recipient certification, statistics indicating proportion of original versus resubmission claims and the percentage of resubmissions ultimately paid (both proportion and percentage obtained from our sample of tracked rejected claims), and State estimates of the proportions of submitted claims that are machine-produced. Estimated staff hours were valued at $8.10 per hour; postage per rejected claim was estimated at 5.2 cents for paper claims and 0.4 cents for tape claims (based on sampling of claims volume and applied postage per envelope or package in the mail room of the fiscal agent). These computations yield a total of $452,500 for administrative costs to providers for submitting rejected claims.

Program benefits policy

This information function refers to State policy governing which services are reimbursable. We have also chosen to include the deficient information costs of provider certification under this heading.

Operating costs

Although we based our annual cost estimate for policy dissemination to providers on the costs of manuals and bulletins, Wisconsin manuals are not revised on a regular basis; bulletins vary in frequency, length, and number of copies distributed, depending on the extent of the policy change and the size of audience to whom the policy change information is directed. Further, our review of cost data in this area was very limited. For both reasons, the following estimates should be regarded with considerable caution.

Based on per page production and mailing costs for two recently amended handbooks in which provider specialty sections were revised, the average cost of a complete (generic plus provider specialty section) provider handbook was estimated at $9.59 per copy. For 28,000 enrolled providers, the aggregate production and mailing cost would be $268,500; however, the share of this cost for annual participating providers (13,582 in fiscal year 1984) would be only about $130,200.[4] Because we will later analyze the cost on a participating provider basis, the latter amount, further reduced to $43,400 annually, assuming a 3-year complete revision schedule, is relevant for our estimations. With regard to provider bulletins, extrapolating from the estimated production and mailing cost of a single (distributed to all providers) bulletin, we obtained the very tentative estimate of $80,000 per year, about $38,800 of which is the share of participating providers.

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[3] For the missing or correctable information subcategory, we assumed only 50 percent of the net rejection amounts were nonreimbursable with perfect information exchange; for the recipient ineligible subcategory, 100 percent were assumed nonreimbursable; for the primary provider violation category, 70 percent were assumed nonreimbursable.

[4] The number of enrolled providers at any one time during the year is, presently, 22,000. The larger number, 28,000, of enrolled providers reflects the aggregate number of providers who are enrolled at some time during the year. Participating providers are enrolled providers who, during some period, submit Medicaid claims.

Deficient information costs

Policy change notification delays

We did not make an estimation of this cost area for Wisconsin. BHCF staff expressed the belief that, in most instances, printing and mailing lags in provider notification of policy change overlapped with other lags in the policy implementation process.

Provider requests for policy clarification

In Wisconsin (as well as other States), the primary, if not the sole source, for clarification of program benefits policy (beyond the information in the provider manuals and bulletins) is the State Medicaid administrative agency. (The fiscal agent is generally restricted to clarifying matters of filing policy and claims status.)

State costs for handling provider correspondence, phone and written, regarding benefits policy were computed by estimating the cost of BHCF staff time devoted to this correspondence, plus computer screen and phone use, and supplies. These computations resulted in an estimated $45,800 per year.

Provider costs for queries concerning benefits policy were computed on the basis of the phone time and written correspondence received by BHCF. Total provider staff time for organizing material relevant to the policy queries and making the calls was estimated by doubling the estimated total of actual phone time between BHCF and provider staff. Because providers must pay toll charges for calls to BHCF, phone toll costs, computed according to an estimated mean charge of $0.46 per minute, were added. Written policy queries from providers to BHCF were assumed to require 20 minutes each, preparation and writing, of provider staff time.

Interviewed providers have indicated that when confused by policy issues, they seek to resolve their confusion (often unsuccessfully) by reviewing the handbooks and bulletins. The costs of this research time might also be relevant, to the extent that a more efficient process for communicating policy was feasible. We do not, however, have a reasonable estimate of the amount of this research time.

The total estimated provider costs for benefits policy queries are $49,100.

Provider reimbursement loss

These are losses to providers resulting from rejection of claims for services not covered by Medicaid. The estimation procedure was the same as that described earlier for loss of reimbursement because of recipient certification error. The losses to providers because of benefits policy error are described by the subcategories under benefits policy, listed earlier (the last subcategory, "not separately or additionally payable," was regarded as equivalent to pricing cutbacks, rather than real rejections). The reimbursement losses owing to provider certification error, which we have also included in this section, are "Provider certification" subcategories. The aggregate provider reimbursement losses resulting from services noncoverage by Medicaid, based on benefits policy, amount to $12,056,200; losses resulting from provider certification error are $5,191,800 (both annual, based on calendar year 1983). We again made computations similar to those described earlier for the recipient certification error, to estimate the amount of those reimbursement losses that would not be reduced by perfect information exchange. The same ethics or charity factor estimates that were applied in the recipient certification estimates were multiplied by the amount of program policy rejections assumed nonreimbursable if the provider had perfect information exchange. The result of these computations is a reduction in the total for the provider certification and benefits policy rejection losses from $17,249,000 to $16,465,200.

Delayed payment

These costs relate to the interest lost to a provider when the initial claim for reimbursement was denied because of provider certification error or benefits policy error, but reimbursement was obtained on resubmission. According to our sample of tracked claim rejections, the estimated aggregate delayed payment amount because of provider certification error is $2,603,700, and the mean number of incremental payment delay days owing to the error is 68.6. At 8 percent simple interest, the delayed payment cost is $39,100. Similarly, for benefits policy error, the aggregate delayed payment amount is $6,549,100, and the mean number of payment delay days owing to such error is 108.5 days. At 8 percent interest, the delayed payment cost is $155,700. The total for provider certification error and policy error is $194,800.

Processing program policy error

These are the State costs for processing claims rejected because of provider certification or benefits policy error. The denials for the benefits policy subcategory, "not separately or additionally payable," were excluded from provider reimbursement loss estimates because this subcategory is considered a payment cutback rather than a full denial; however, the claim details counted in this subcategory still determine avoidable processing costs and are therefore included in our computations. The estimated costs (computed as in the case of recipient certification) are $23,500 for the provider certification category and $154,900 for the benefits policy category, totaling $178,400.

Submission claims rejected

These are the costs to providers of submitting claims that are rejected by the claims-processing agent owing to provider certification or benefits policy error. The same methods of computation were followed as for costs of submitting claims that were subsequently rejected because of recipient certification error, as described earlier. The cost computations were performed utilizing the volume of rejections owing to errors concerning provider certification and benefits policy. Other statistics are the same as those indicated in the recipient certification error cost computations. The estimated provider cost of submitting claims rejected for reasons of provider certification and benefits policy error is $154,200.

Providers' claims for reimbursement

Operating costs

The normal operating costs of the current process include the provision by the State of claims filing rules,[5] the production and mailing of blank claim forms (and the return mailing to providers of submitted claim tapes), and the data entry and processing of claims for reimbursement: prior authorization requests, adjustment requests, second surgical opinion forms, and cash refund requests. Our study, focusing on the transfer of information related to provider claims for reimbursement, essentially sets aside the claims-processing operation, as opposed to claims submission, from present consideration. (We chose also not to include provider staff time for completing the Medicaid claim forms.) However, because alternative means of submitting claims do offer the elimination of current procedures of data entry from paper media, data entry costs are relevant.

The current annual cost of producing paper claim forms in Wisconsin is $268,400, and the cost of mailing the forms to providers (some pick the forms up at the fiscal agent's office) is $28,300, resulting in a total of $296,700.

According to the estimates obtained from State sources, the cost of data entry for all claims and claims-related paper media is about $1,098,000.

Provider staff time for filing claims represents a significant cost in the current system, but it is not clear what proportion, if any, of this time can be reduced by alternative filing processes, such as electronic claims submission. In any case, we have not carefully estimated costs of provider claims completion. Mean costs of mailing claims to the fiscal agent are about 5.2 cents per paper claim (borne by the provider) and about 0.4 cents per tape claim (representing 0.2 cents of provider expense for mailing the tapes to the fiscal agent and 0.2 cents of State expense for returning the tapes to the provider).[6] These per-claim estimated costs indicate aggregate annual costs to providers of $403,700 for mailing paper claims and $3,600 for mailing tape claims, for a total of $407,300. The State cost of returning the submitted tapes is estimated at $3,600.

Deficient information costs

Provider requests for claims clarification

In Wisconsin, providers may attempt to resolve confusion about claims filing by phoning or writing the fiscal agent. As in the case of recipient certification queries, calls to the fiscal agent may be made over a toll-free number, though several attempts may sometimes be necessary to obtain a free line.

The State costs of these provider queries were computed by estimating costs of fiscal agent staff time allocated to receiving phone calls and handling written correspondence in this area. We also included an estimated proportion of phone expenses allocated to these calls. We obtained an estimated total State expense of $198,500 for handling queries from providers concerning claims filing.

The provider costs were estimated from State data concerning phone calls and letters received by the fiscal agent. The fiscal agent's estimated staff time for these phone queries was adjusted for the proportion of actual on-phone time, then doubled to account for additional provider time in preparing information for the call and completing the call. Providers' staff time for letters was estimated on the basis of 20 minutes per written query received by the fiscal agent. A postage estimate was added. Total estimated provider costs for lodging claims filing queries is $128,100.

Provider reimbursement loss

The reimbursement loss to providers as a result of having claims for services rejected owing to claims filing error was estimated according to the same procedures employed in estimating the reimbursement losses because of recipient certification and benefits policy error. The provider reimbursement losses for claims filing error are estimated for the denial categories for missing or invalid claim data and for missing or correctable data. The aggregate provider reimbursement loss represented by these claim denial categories is estimated to be $12,853,600. Almost all of the denials because of claims filing error are assumed avoidable through improved provider information. As a result, the application of the provider ethics or charity factor, computed as in previous sections, results in little change, merely reducing the estimated filing error loss to $12,852,600.

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[5] We did not attempt to separate the costs of printing and transmitting to providers the rules for claims filing from the costs of program benefits policy. The costs for both are included in the previous section on Medicaid program benefits policy.

[6] The postage cost (at 1983 rates) per paper claim was estimated from a sample of mailed claims envelopes and packages received in the mail room of the fiscal agent. The cost per tape claim was estimated from tape mailing costs supplied by State sources.

Delayed payment: Filing error

These costs represent the interest lost when the initial claim was rejected (denied or returned) because of claims filing error, but reimbursement was obtained after resubmission. Our sample of tracked rejected claims indicates that for the denial category of missing or invalid claim data, the aggregate delayed payment amount for 1983 was $7,852,600; the mean number of incremental payment delay days owing to the errors in these categories was 53.0, and the estimated delayed payment cost was $91,200. Similarly, for the returned claims categories, the aggregate delayed payment amount was $23,364,000, the mean number of incremental payment delay days was 47.3, and the estimated delayed payment cost was $242,100. The total costs of delayed payment due to filing error are therefore $333,300.

Delayed payment: Billing and processing

The lags described in the preceding section and other earlier sections involve only the incremental reimbursement lags, owing to initial rejections of ultimately paid claims, and constitute a subset of the total billing lag for submitted claims. Besides this lag component, accounted for by rejections because of various provider errors, submission lags are the result of several factors, including delayed allocation of provider staff time to the task (some of the providers interviewed said they tended to put off completion of the forms because of the detailed information required) and the need to bill other insurance coverage prior to billing Medicaid. In a small percentage of claims submitted, there is an unavoidable billing lag as providers await the completion of retroactive recipient certification. To the extent that an automated billing process could encourage (or facilitate) faster claims submissions by providers and reduce the other insurance billing lag, this general lag might be reduced. From routine State Medicaid reports, we obtained mean overall provider billing lags and provider net paid amounts for July 1983 through June 1984. The estimated interest cost (using an 8 percent simple interest rate) for the overall billing lag is $9,072,857. Of this amount, a total of $722,300 has already been counted in the estimate of delayed payment costs because of the various error categories. Of the remaining amount, we assume 1 percent might be the result of retroactive recipient certification, leaving $8,267,700 as the potentially reducible general billing lag cost.

The processing lag is the result, in part, of State-determined "pending" (temporary suspension) of certain claims and the speed of the State or the fiscal agent in resolving those actions. It is also the result of the frequency of edit and audit cycles, which are run by the fiscal agent. Some reduction in the processing lag might result from improvement in the quality of information on the claim form supplied by providers, but substantial reduction in the processing lag might require altered State guidelines on "pending" claims and more frequent (or real time) edit and audit cycles.

From routine State Medicaid reports, we also obtained the mean processing lags for the period July 1983 through June 1984. Applying these lags to the net payment amounts (and again utilizing an 8 percent rate of interest), gives a processing lag cost (compared with an ideal of instantaneous processing) of $2,589,000.

Processing filing errors

The costs to the State for processing claims that are denied because of claims filing error (as defined earlier) were estimated to be $151,800 for the missing or invalid claim data denials and $55,000 for the claim returns, for a total of $206,800.

Submission of claims rejected

The same methods of computation were followed as for recipient certification error submission costs and for program policy error submission costs, described earlier. The estimated provider costs of submitting claims rejected for filing error (defined by the indicated rejection categories) is $224,200.

Claims status advice

Operating costs

The estimated printing costs for the remittance advice statements, which advise providers of the adjudication status of their submitted claims, is about $43,800 annually. The mailing cost of these statements is about $395,200 annually.[7]

Deficient information costs

Provider queries concerning claims status

Providers may ask about the status of their submitted claims by phoning or writing to the fiscal agent. Phone calls to the fiscal agent may be made on the fiscal agent's toll-free number. The State costs of responding to these queries were computed by estimating costs of fiscal agent staff time allocated to receiving phone calls and written correspondence. An estimated proportion of phone calls at State expense was also included. The result was an estimated $15,400 State expense for claims status queries from providers.

The provider costs for lodging the queries were estimated from State data concerning the queries, according to the methodology described previously. The result was an estimated provider cost of $9,900 for claims status queries.

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[7] These cost data were obtained from State sources. Remittance advice statements are mailed jointly with provider checks. The joint mailing expense was allocated between the remittance advice statements and the checks.

Processing duplicate rejections

These are the State costs for processing claims that are duplicates of previously submitted claims. The estimated cost, based on aggregate duplicate claim rejections and estimated processing costs, is $138,300.

Submitting duplicate claims

The methods of cost computation for administrative costs because of submission error, described earlier, were followed for submitting claims rejected because of duplicate submission. The estimated administrative costs to providers because of rejected duplicate claim submission is $61,800.

Payment to providers

Operating costs

The estimated printing cost for provider checks is $8,200 annually, and the cost of mailing the checks to providers is about $74,100 annually.

Deficient information costs

The single cost estimated under this heading is that of the payment transmittal lag, the period between final adjudication of a claim and the time the provider has payment in hand. This lag, conservatively estimated at 5 days, was applied to the same net paid amounts used in the billing and processing lag cost computations, at the usual 8 percent interest rate. The total transmittal lag costs for the July 1983 to June 1984 period were thus estimated at $1,022,200.

Summary of deficient information costs

As shown at the top of Table 1, deficient information costs to the State total $2.6 million; those of providers are much higher, at $72.5 million. On the other hand, estimated operating costs of the State are almost $2.6 million, but those of providers are only $0.4 million.

We noted earlier that our estimated deficient information costs may represent any of three situations:

- Some parties may bear unintended costs, while other parties obtain associated unintended benefits.
- Costs may be shifted from one party to another.
- There may be net (dead weight) costs to the system as a whole.

In Table 2, our estimated deficient information costs (extracted from Table 1) are presented according to these three situations.

Amounts in the unintended costs and benefits category reflect medical services to recipients that we estimate would not have occurred under perfect information exchange. The State incurs $871,800 and providers $33,909,200 of such costs, as shown in Table 2. Given perfect information exchange, the State and providers might have these costs eliminated, and recipients would lose the services associated with the costs. (These estimates do not include the nonreimbursed services that we assumed providers might deliver anyway, out of ethical or charitable considerations.)

"Shifted" costs are those transferred by the State to providers. They involve either provider-rendered services (which are not reimbursed by the State, but which could be reimbursed if providers had acted upon perfect information exchange concerning required procedures for rendering and filing for the services) or time costs of delayed reimbursement for services because of billing, processing, and payment lags. The total cost shifted to providers from the State is $36,844,300.[8] Given perfect information exchange, these costs might not be incurred by providers, but only if these costs were shifted back to the State.

System costs include the numerous administrative costs to both providers and the State associated with their attempts to cope with imperfect information. The State bears an estimated $1,757,300 and providers an estimated $1,722,800 of net system costs.

Cost estimates per provider

Our provider cost estimates have been presented on an aggregate basis for all Medicaid providers. An expression of these costs on a per provider basis would be much more meaningful, especially as an indication of what level of automated intervention might be worthwhile for individual providers. However, existing statistical reports are not geared toward providing the kind of synchronized data required to obtain per provider cost statistics.

We decided to focus on the number of participating billing providers, without attempting to sort out those who are temporarily enrolled. Because of system requirements, some providers (perhaps about 5 percent) must have more than one billing number and will therefore be multiple-counted. We also wished to indicate the considerable per provider variation in anticipated costs among the different provider types.

The only feasible disaggregation of our cost estimates for both claims rejection and payment lag, utilizing existing reports, is based on the different claim types that providers use for billing. However, individual providers may bill among various claim types, depending on the particular service for which they are claiming reimbursement; in those instances, a particular service will be multiple-counted among claim types (though single-counted within claim types). Nevertheless, we have attempted to use these data to obtain per provider estimates by grouping and

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[8] Provider costs owing to nonreimbursement of rejected claims were distributed between the unintended costs and benefits category and the shifted costs category, according to our assumptions concerning the proportions of nonreimbursed services that might be reimbursed under perfect information. The assumptions seem plausible, but the distribution should be considered only approximate.

Table 2

Unintended costs and benefits, shifted costs, and system costs, by information function: Calendar year 1983

Information function	Unintended costs and benefits[1] State	Unintended costs and benefits[1] Providers	Shifted costs from State to providers	System costs State	System costs Providers
	Estimated annual cost in thousands				
Total	$871.8	$33,909.2	$36,844.3	$1,757.3	$1,722.8
Recipient certification					
Reimbursement following eligibility termination	871.8	—	—	—	—
Request for verification of recipient certification	—	—	—	483.6	643.0
Provider reimbursement loss	—	25,366.6	3,468.0	—	—
Delayed payment because of certification error	—	—	194.1	—	—
Processing of claim rejections	—	—	—	490.5	—
Submission of claims rejected	—	—	—	—	452.5
Program benefits policy					
Provider requests for policy clarification	—	—	—	45.8	49.1
Provider reimbursement loss	—	8,530.7	7,934.5	—	—
Delayed payment because of benefits policy error	—	—	194.8	—	—
Processing of claim rejections	—	—	—	178.4	—
Submission of claims rejected	—	—	—	—	154.2
Providers' claims for reimbursement					
Provider requests for filing policy clarification	—	—	—	198.5	128.1
Provider reimbursement loss	—	11.9	12,840.7	—	—
Delayed payment because of filing error	—	—	333.3	—	—
General delayed payment lags:					
Billing	—	—	—	206.8	—
Processing	—	—	—	—	224.2
Processing of claim rejections	—	—	—	15.4	9.9
Submission of claims rejected	—	—	—	138.3	—
Claims status advice					
Provider queries concerning claims status	—	—	—	—	61.8
Processing of duplicate claim rejections	—	—	—	—	—
Submission of claims rejected as duplicate	—	—	—	—	—
Payments to providers					
Payment transmittal lag	—	—	1,022.2	—	—

[1] The unintended benefits are conveyed to recipients.

SOURCES: Data are estimated from State of Wisconsin Medicaid Management Administrative Reporting Subsystem reports; samplings of Medicaid claims histories; and interviews with Medicaid providers, staffs of recipient certification agencies, and State of Wisconsin Medicaid administrative staff.

adjusting some of the figures. Although the resulting statistics lack precision, they should provide useful indications of the relative magnitude of costs over different provider groupings.

Because the counts of participating providers by claim type are only available on a monthly basis, they had to be adjusted upward to account for providers who participate in some months but not in others; in addition, a downward adjustment was required by the multiple counting of providers across claim types.

Our estimates of providers' reimbursement losses owing to rejected claims (for recipient certification, benefits policy and provider certification, and claims completion error) plus the billing, processing, and payment transmittal lag costs, distributed among our six provider groups are presented in Table 3. (The 6 groups were aggregated, for statistical convenience, from the 11 claim types among which providers bill.) The number of providers in each of the 6 groups is a rough estimate, obtained by sample estimation procedures, of the number of annual participating billing providers in the group.[9] The disaggregated costs are somewhat inexact as well, owing to imperfect adjustment for the multiple counting across claim types of some providers. Other estimated provider costs given in Table 1 are also summarized in Table 3, but without disaggregation according to provider group.

The estimates of mean per provider costs shown in Table 3 reveal considerable variation among provider groups. Whereas the annual mean per provider cost of all claim rejections is about $4,300 for all provider groups when aggregated, the mean cost ranges from $77,800 for hospitals through $23,700 for nursing homes and $2,600 for the professional group, down to $600 for the dental group.

For most provider groups, recipient certification rejections are the major component of the rejections

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[9] The provider counts relate to the 12-month period from July 1983 through June 1984. The claims rejection data are for calendar year 1983. The billing, processing, and payment transmittal lag costs are for July 1983 through June 1984. Other cost data in the table are mostly annual estimates for calendar year 1984.

Table 3
Summary of all estimated provider costs, by provider group: Calendar year 1983

		Claims rejection reimbursement costs				Lag costs				
Provider group	Number of providers	Total	Recipient certification	Benefits policy and provider certification	Claims completion	Total	Billing[1]	Processing	Payment transmittal	Other costs
		Annual cost in thousands								
Total	13,582	$58,152.4	$28,834.6	$16,465.2	$12,852.6	$12,601.2	$8,990.0	$2,589.0	$1,022.2	$2,130.1
		(4.282)	(2.123)	(1.212)	(.946)	(.928)	(.662)	(.191)	(.075)	(.157)
Pharmacy	1,331	1,465.4	646.1	253.7	565.6	510.5	318.6	133.7	55.3	—
		(1.101)	(.485)	(.191)	(.425)	(.384)	(.239)	(.100)	(.042)	
Dental	2,390	1,510.3	615.3	676.5	218.5	130.9	84.3	32.4	13.4	—
		(.632)	(.257)	(.283)	(.091)	(.055)	(.035)	(.014)	(.006)	
Professional	6,693	17,279.1	6,121.1	5,245.8	5,912.2	1,781.6	1,340.7	328.5	100.0	—
		(2.581)	(.914)	(.784)	(.883)	(.266)	(.200)	(.049)	(.015)	
Hospital	296	23,040.6	13,667.9	4,771.7	4,601.0	5,251.3	4,154.9	817.6	240.5	—
		(77.839)	(46.175)	(16.121)	(15.544)	(17.741)	(14.037)	(2.762)	(.813)	
Nursing home	475	11,275.2	5,507.4	4,739.5	1,028.3	4,250.9	2,504.7	1,160.2	562.9	—
		(23.737)	(11.594)	(9.978)	(2.165)	(8.949)	(5.273)	(2.443)	(1.185)	
Other practitioner	2,397	3,581.3	2,276.8	778.0	527.0	758.9	586.8	116.6	50.1	—
		(1.494)	(.950)	(.325)	(.220)	(.317)	(.245)	(.049)	(.021)	

[1] These billing lag costs include, in addition to general billing lag costs, delayed payment costs from recipient certification error, program policy error, and filing error (Table 1).

[2] Includes $407,300 for provider mailing costs (included in the "operating costs" section of Table 1).

NOTE: Mean per provider cost estimates (computed on the basis of the estimated number of participating providers) appear in parentheses beneath aggregate cost estimates.

SOURCES: Data are estimated from State of Wisconsin Medicaid Management Administrative Reporting Subsystem reports; samplings of Medicaid claims histories; and interviews with Medicaid providers, staffs of recipient certification agencies, and State of Wisconsin Medicaid administrative staff.

total. For the lag costs in billing, processing, and payment transmittal, only hospitals ($17,700) and nursing homes ($8,900) have annual mean costs totaling more than $1,000. In each of the provider groups, the billing lag is the largest of the three lags.

These mean per provider estimates undoubtedly conceal great variation among individual providers within each group. It is likely that many providers in a group will have cost levels considerably higher than the estimated means. Unfortunately, we were unable to investigate the distribution of costs among individual providers.

Other State Medicaid programs

In an attempt to learn whether the results of our study of Medicaid in Wisconsin might be roughly representative of Medicaid programs in other States, adjusted for the relative program sizes of the other States, Medicaid program staff in 12 States were queried by phone, and brief visits were made to 4 of those States: New York, Michigan, Florida, and Arkansas. Compared with Wisconsin (1.0), these States have the following proportionate Medicaid payment magnitudes: New York, 7.4; Michigan, 1.6; Florida, 0.67; and Arkansas, 0.33.

It was not possible, during the phone survey, to obtain statistical data relevant to cost-study comparisons. The phone survey mainly served to confirm that various procedures of program operation (which generate the identified costs) were roughly similar to Wisconsin. Although the visits to the four States did enable us to collect some statistical data relevant to cost comparisons, such comparisons demand considerable caution. Because the brief time allocated to the visits did not allow detailed study of definitions and procedures used in the statistical reports obtained, we cannot be sure that apparent differences in statistical values accurately reflect real differences in the values of the variables.

Generally, however, information obtained concerning program procedures, as well as statistical information on claims rejections, billing, processing and payment lags, and volume of provider queries strongly indicate that our cost estimates for the Wisconsin Medicaid program are not atypical with respect to Medicaid programs in other States.

What can we say nationally, then, on the basis of the Wisconsin data on costs of deficient information? In 1982, the mean program expenditures size of the other 48 States (Arizona excluded) and the District of Columbia was .795 of the Wisconsin expenditure size. Assuming the losses for the other 49 jurisdictions to be proportional to the Wisconsin loss, the aggregate loss for all 50 jurisdictions would be 40 times the Wisconsin loss, or about $3 billion annually.

We learned also, during our limited survey of other States, that some States have begun to seek, or have already implemented, automated procedures to reduce some of the information costs described in our Wisconsin study. Such automated procedures include on-line recipient certification verification systems for providers and electronic claims submission.

Beyond Medicaid

Many of the cost areas that we are examining for Medicaid are also significant not only for the other major governmental personal health care program, Medicare (which has national expenditures 50 percent greater than Medicaid), but for all third-party coverage.

Under Medicare and private third-party coverage, providers will experience losses owing to noncovered services (based on eligibility and policy rejections), payment delays (because of intermediate rejections and general billing and payment delays), and administrative costs (when providers assume the claims filing responsibility) in submitting and resubmitting rejected claims and attempting to sort out the difficulties experienced in getting claims paid.

Under Medicaid, the widespread existence of dual third-party coverage (usually Medicare in addition to Medicaid) contributes heavily to providers' administrative costs. An appreciable number of claims rejections are because of the requirement that providers submit claims to Medicare and to other insurance coverage before submitting to Medicaid. To the extent that an automated intervention could be comprehensive, including Medicare and, perhaps, commercial insurance as well, administrative savings within Medicaid alone would be enhanced.

A brief review of private insurance company claims adjudication and provider communication procedures indicates that although recipient certification may be less of a problem and benefits policy perhaps less complex, the same issues we found in our Medicaid study apply, generally, to the private insurance area as well.

Conclusion

We stated at the outset that this study was motivated by our intuitive view that appreciable costs result from various discontinuities in information exchange among Medicaid program parties. The results of this study, focusing on information exchange between the State and Medicaid providers, have confirmed that considerable costs appear to result from imperfect information exchange. Although the pattern and relative magnitude of costs may vary for Medicaid programs in other States, our limited review of programs in selected States suggests that our Wisconsin findings may be indicative of information exchange costs for Medicaid nationally.

It remains for individual States to carefully evaluate already developed, or proposed, automated interventions to deal with the various information exchange cost areas described here. The costs of these interventions need, in each instance, to be compared with the expected reduction in existing costs associated with information exchange under the present system, to see if that reduction (the automated intervention gross benefit) exceeds the intervention cost. The distribution of aggregate costs between program actors and the implications of terminating certain shifted costs (and unintended benefits) will also be relevant to consideration of which parties should pay for implementing the intervention.

While this study was in progress, some States were experimenting with, planning to implement, or even had already implemented automated interventions designed to deal with some of the information exchange problem areas studied here. The cost-benefit experience of these States, to the extent that it is carefully documented in the implementation of these interventions, will be most useful to States that have not yet embarked on such interventions.

Ideally, the interventions selected should not merely offer some positive benefit-cost advance relative to the current system, but rather the maximum benefit-cost advantage; this would be accomplished by dealing not only with the broadest range of Medicaid information transfer costs, but with the range of information transfer for all third-party insurance programs.

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Special Report

Prospective payment for Medicare skilled nursing facilities: Background and issues

by George Schieber, Joshua Wiener, Korbin Liu, and Pamela Doty

Strong interest by Congress in a Medicare prospective payment system for skilled nursing facilities (SNF's) resulted in a major study by the Health Care Financing Administration on the Medicare SNF benefit. This article highlights findings from that study, which addressed the following: the Medicare SNF benefit, utilization and expenditures, the Medicare SNF industry, problems with the current Medicare SNF reimbursement system, efforts to develop a Medicare SNF case-mix measure, and case-mix differences between hospital-based and freestanding SNF's. In addition, we discuss the implications of the study findings for the design of a Medicare SNF prospective payment system (PPS).

Introduction

Prospective payment systems (PPS's) are increasingly replacing retrospective, cost-based reimbursement methodologies. This change has been prompted by general dissatisfaction with the latter method, which, it is widely accepted, does not encourage efficiency because it does not reward cost-containing behavior. During the last 3 years, Medicare has implemented PPS's for acute care hospitals, renal dialysis facilities, hospices, and freestanding ambulatory surgical centers. In addition, there has been strong congressional interest in developing a Medicare PPS for skilled nursing facilities (SNF's). This interest was reflected by the recently enacted Consolidated Omnibus Budget Reconciliation Act of 1985 (COBRA), which provided for an optional prospective payment rate for SNF's with fewer than 1,500 patient days.

The COBRA provision resulted, in part, from analyses of the Medicare SNF benefit conducted by the Department of Health and Human Services (DHHS) in response to provisions in the Tax Equity and Fiscal Responsibility Act (TEFRA) of 1982, the Social Security Amendments of 1983, and the Deficit Reduction Act of 1984. The first result of these analyses was a Health Care Financing Administration (HCFA) report entitled *Study of the Skilled Nursing Facility Benefit Under Medicare*, which was submitted to Congress in April 1985 (Health Care Financing Administration, 1985). This article highlights findings from that report and elaborates on them.

Background and context

The Medicare skilled nursing benefit covers short-term (up to 100 days), post-acute nursing home care for people needing skilled nursing or rehabilitative services in an inpatient setting. The Social Security Act sets stringent requirements concerning the level of skilled care necessary to qualify for Medicare coverage. Hence, Medicare-covered SNF care differs from the long-term care covered by the Medicaid nursing home benefit. In 1980, the average Medicare coverage of an SNF stay was 30 days, much shorter than the average stay of 456 days for all nursing home patients.

The Medicare SNF benefit is small both as a percentage of Medicare expenditures and as a proportion of total national nursing home revenues. The $529 million spent for Medicare SNF benefits in calendar year 1983 constituted slightly less than 1 percent of total Medicare expenditures. This was slightly less than 2 percent of all nursing home expenditures. On the other hand, in 1983, about 31 percent of Medicaid expenditures was for nursing home care (SNF and intermediate care facility [ICF]), and Medicaid accounted for nearly 50 percent of all nursing home expenditures. The 50 percent substantially understates the role of Medicaid in the nursing home industry. This is because Medicaid recipients must contribute all but $25 of their monthly income towards their cost of care; these contributions are counted in HCFA statistics as private, out-of-pocket payments.

Since 1975, both total expenditures and per diem payments for Medicare SNF care have increased at a modest rate. Total expenditures increased from $278 million in 1975 to $529 million in 1983, at an average annual rate of growth of 8.4 percent (Table 1). Per diem payments increased at an annual compound rate of 7.7 percent during the 1975 to 1983 period. During the same period, the SNF "market basket," a measure of the costs of inputs (e.g., food, utilities, and nursing wages) used to provide a day of nursing home care, grew at an annual compound rate of 8.3 percent.

Since 1973, Medicare-covered SNF days per year have been generally stable at about 9 million days (Table 2). A covered day is one that meets the conditions necessary for Medicare payment. Between 1973 and 1983, however, the number of covered days per 1,000 Medicare enrollees tended to decline both for aged and disabled enrollees. In 1980, there were approximately 274,000 Medicare SNF admissions

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The views expressed in this article are solely those of the authors and do not represent those of the Health Care Financing Administration, the U.S. Department of Health and Human Services, the Brookings Institution, the Urban Institute, or the Organization for Economic Cooperation and Development.

Table 1

Total and per diem Medicare skilled nursing facility (SNF) payments: Calendar years 1975–83

Calendar year	Total payments: Expenditures in millions	Total payments: Percent change	Per diem payment: Amount	Per diem payment: Percent change	SNF market basket percent change
1975	$278	—	$31.31	—	—
1976	327	17.6	33.64	7.4	7.3
1977	362	10.7	37.59	11.7	6.8
1978	347	(−4.1)	38.64	2.8	8.8
1979	368	6.1	43.60	12.8	9.2
1980	396	7.6	47.03	7.9	9.9
1981	433	9.3	51.67	9.9	9.6
1982	468	8.1	54.04	4.6	7.4
1983[1]	529	13.0	56.75	5.0	5.7
Annual compound rate of growth 1975–83	—	8.4	—	7.7	8.3

[1] Estimate.

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare Statistical System.

Table 2

Medicare-covered days in skilled nursing facilities: Calendar years 1973–83

Calendar year	Covered days in millions	Covered days per 1,000 beneficiaries	Covered days per 1,000 aged beneficiaries	Covered days per 1,000 disabled beneficiaries
1973	8.63	373.58	398.70	61.76
1974	8.97	377.76	398.29	144.28
1975	8.88	363.10	385.26	133.90
1976	9.72	387.18	413.84	132.93
1977	9.63	373.24	399.59	128.33
1978	8.98	338.18	364.46	113.56
1979	8.44	309.96	333.98	108.38
1980	8.42	302.32	325.91	103.39
1981	8.38	297.47	321.72	94.48
1982	8.66	301.10	24.19	96.89
1983[1]	9.32	319.76	342.76	102.82

[1] Estimate.

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare Statistical System.

involving at least 1 covered day (data not shown). With the advent of hospital prospective payment by Medicare, preliminary data indicate that there has been a slight increase in Medicare SNF utilization.

Medicare skilled nursing facilities

A nursing home can be certified in whole, or in part, for participation in Medicare, Medicaid, or both programs. About 5,000 nursing homes are certified to provide Medicare services, about two-thirds of all SNF's. For a variety of reasons, only 3,492 facilities submitted complete cost reports in fiscal year 1980. Of the SNF's that filed cost reports, approximately two-thirds are proprietary (for profit), with the rest divided between government and nonprofit facilities (Table 3). Eighty-six percent of the Medicare-certified facilities are freestanding. For participating SNF's, Medicare accounts for an average of 14 percent of patient days in these facilities (not on table).

However, fewer than 400 SNF's provide 40 percent of total Medicare days (not on table); these facilities are highly dependent on Medicare revenues. The vast majority of certified SNF's provide very few Medicare days.

The approximately 500 hospital-based facilities are evenly divided between urban and rural locations. Hospital-based facilities tend to provide proportionately more care to Medicare beneficiaries than freestanding SNF's, accounting for 20 percent of total days while supplying only 10 percent of certified beds.

The availability of Medicare-certified SNF beds in all types of facilities varies across States. In fiscal year 1981, Medicare SNF beds per 1,000 elderly varied from a low of 1 in Arkansas and Oklahoma to a high of 51 in North Dakota; the State average was 18. The use rate of the Medicare SNF benefit also varied across States from a low of 1 day of Medicare-covered SNF care per 1,000 elderly in Wyoming to a high of 635 in Kentucky; the State average was 310.

The average total cost per day for Medicare SNF services (i.e., routine operating, ancillary, and capital) was $80 in fiscal year 1983, of which 72 percent was for routine operating costs, 22 percent for ancillary costs, and 6 percent for capital costs (Table 4). Hospital-based facilities are much more costly than freestanding facilities.

A multivariate regression analysis was conducted to study the effects of different facility characteristics (e.g., ownership, size) on total, routine operating, ancillary, and capital costs. The results, presented in Table 5, show that the facility characteristics included in the analysis explain a substantial amount of variation in total cost (nearly 55 percent) and in routine operating costs (55 percent). These characteristics do less well in explaining variations in ancillary costs (26 percent) and quite poorly in explaining capital costs (17 percent). The regression analysis estimates how much each facility characteristic affects costs when all others are held

Table 3

Number and percent of skilled nursing facilities, beds, and Medicare patient days, by type of ownership and facility: Fiscal year 1980

Type of ownership and facility	Medicare-certified facilities		Medicare-certified beds		Medicare patient days		Total patient days	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total	3,492	100.00	276,986	100.00	7,359,135	100.00	94,497,364	100.00
Hospital-based	488	13.98	28,465	10.27	1,467,738	19.94	9,291,636	9.83
Freestanding	3,004	86.02	248,521	90.73	5,891,397	80.06	85,205,728	90.17
Proprietary (total)	2,318	66.38	176,077	3.57	4,779,656	64.95	60,070,063	63.57
Hospital-based	40	1.15	2,088	.75	216,341	2.94	662,671	.70
Freestanding	2,278	65.23	173,989	62.82	4,563,315	62.01	59,407,392	62.87
Nonprofit (total)	854	24.46	67,323	24.31	1,966,745	26.72	22,953,749	24.29
Hospital-based	283	8.10	14,742	5.32	918,865	12.48	4,772,837	5.05
Freestanding	571	16.35	52,581	18.98	1,047,880	14.24	18,180,912	19.24
Government (total)	320	9.16	33,586	12.12	612,734	8.33	11,473,552	12.14
Hospital-based	165	4.73	11,635	4.20	332,532	4.52	3,856,128	4.08
Freestanding	155	4.44	21,951	7.92	280,202	3.81	7,617,424	8.06

SOURCE: The Urban Institute: Data from the Medicare Skilled Nursing Facility Study, 1983.

Table 4

Average for skilled nursing facilities per diem costs, by type of facility and cost: Fiscal year 1983

Type of cost	All facilities		Hospital-based		Freestanding	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Total costs[1]	$79.78	$65.39	$131.51	$102.70	$61.80	$34.32
Routine operating costs	57.63	45.82	94.98	65.97	47.51	30.24
Routine nursing	23.24	18.24	36.85	27.69	19.03	11.36
Routine overhead	34.39	29.20	58.14	42.31	28.48	20.28
Medicare ancillary costs	17.23	24.28	29.75	44.63	11.33	14.55
Drugs and supplies	6.90	9.49	8.18	13.85	4.62	8.95
Therapy	10.33	19.90	21.57	37.94	5.71	11.09
Capital costs	4.92	6.02	6.78	11.41	3.96	4.40

[1] Totals may not add because of rounding.

NOTE: Per diem costs are weighted by Medicare days.

SOURCE: The Urban Institute: Data from the Medicare Skilled Nursing Facility Study, 1983.

constant. In Table 5, for example, the hospital wage index, number of Medicare-certified beds, percentage of total inpatient days that are Medicare, admissions per bed, freestanding distinct-part facility, and hospital-based facility increase total facility costs, while the other characteristics decrease total facility costs.

Problems with the current system

Currently, Medicare services in SNF's are largely reimbursed on a retrospective, reasonable cost basis, subject to limits applied to routine operating costs (e.g., nursing, meals). Ancillary costs, such as physical therapy, drugs, and capital, are not included in the cost limits. The cost limits are set at 112 percent of the average costs of urban and of rural facilities. Prior to October 1, 1982, separate limits were in effect for hospital-based and freestanding facilities. TEFRA eliminated these dual cost limits, mandating single limits based on the lower costs of the freestanding facilities, subject to such adjustments as the Department of Health and Human Services Secretary deemed appropriate. The Deficit Reduction Act of 1984 extended the pre-TEFRA dual limits to July 1, 1984. After July 1, 1984, reimbursement limits for hospital-based SNF's would be set at the corresponding limits for freestanding SNF's plus the following: 50 percent of the amount by which 112 percent of the hospital-based SNF costs exceeded the limit for freestanding SNF's. An add-on to the hospital-based rate ceiling for the additional costs due to the Medicare cost allocation process is also required.

Responding to reports of limited beneficiary access to SNF's, Congress, as part of COBRA, developed an option with strong incentives to increase Medicare program participation. Low-utilization SNF's, with fewer than 1,500 Medicare days, may elect to be paid 105 percent of mean operating and capital costs of all (both hospital-based and freestanding) facilities rather than be paid their actual costs. Separate rates are

Table 5

Dependent variables of skilled nursing facility per diem costs, by independent variables: Fiscal year 1980

	Dependent variables[1]			
Independent variables	Total costs	Routine operating costs	Medicare ancillary costs	Capital costs
Constant	$51.13	$39.33	$5.87	$5.93
Rural area	−2.01 (−2.06)	0.05 (−0.073)	−1.95 (−4.12)	−0.01 (−0.04)
Proprietary facility	−11.92 (−8.58)	−14.92 (−14.91)	1.48 (2.18)	1.52 (7.86)
Nonprofit facility	−0.81 (−0.60)	−3.31) (−3.39)	1.09 (1.65)	1.41 (7.49)
Hospital wage index	48.40 (19.17)	37.59 (20.67)	9.14 (7.44)	1.67 (4.76)
Number of Medicare-certified beds	0.03 (4.90)	0.03 (8.10)	0.14 (−3.47)	0.03 (5.45)
Percent of total inpatient days that are Medicare	0.46 (19.80)	0.30 (17.59)	0.14 (12.04)	0.03 (9.12)
Admissions per bed	0.40 (4.01)	0.25 (3.45)	0.16 (3.46)	−0.02 (−1 15)
Certified bed occupancy in 1980	−0.46 (−12.90)	−0.33 (−12.69)	−0.70 (−4.03)	−0.64 (−12.97)
Freestanding distinct-part facility	2.57 (3.06)	3.02 (5.00)	−0.90 (−.221)	0.45 (3.86)
Hospital- based facility	31.98 (23.48)	21.15 (21.57)	9.71 (14.66)	1.12 (5.91)
Chain facility[1]	−3.40 (−3.58)	−4.59 (−6.72)	1.89 (4.10)	−.70) (5.34)
Variance explained	54.56	55.33	26.18	17.27

[1] 10 or more facilities under same ownership.

NOTE: t-statistics are shown in parentheses.

SOURCE: The Urban Institute: Data from the Medicare Skilled Nursing Facility Study, 1983.

calculated for urban and rural facilities. Implementation of this new system will begin on October 1, 1986.

As with all reimbursement methodologies under Medicaid, States are quite free to establish their own payment systems. As a result, there is considerable variation in SNF reimbursement methods under Medicaid. In contrast to Medicare's retrospective reimbursement system, 37 States employ various forms of prospective payment, the most common of which is facility-specific rates trended forward by inflation. Only 10 States use retrospective systems similar to Medicare's. Three States use a method that combines various approaches.

The current retrospective, cost-based reimbursement system is widely believed to have deficiencies, including lack of incentives for efficiency, excessive reporting requirements, and financial uncertainty created by retroactive adjustments. The nursing home industry asserts that because of these deficiencies, many SNF's do not participate in the Medicare program, resulting in inadequate patient access and a backlog of hospital patients awaiting nursing home placement.

One of the main purposes of introducing hospital prospective payment into the Medicare program was to constrain the large annual increases in hospital expenditures. For example, Medicare hospital expenditures increased from $11.5 billion in 1975 to $40.4 billion in 1983. Most studies have found Medicaid nursing home prospective payment systems to be generally cost constraining, although certain retrospective cost systems can match the cost constraints in the prospective reimbursement approaches (Birnbaum et al., 1981; Buchanan, 1981; Holahan, Cohen, and Scanlon, 1982). Notwithstanding the fact the current retrospective, cost-based reimbursement system contains few incentives to restrain costs, expenditure increases for Medicare SNF's, as reported earlier, have been modest. Although it is difficult to impute casuality to this relatively modest rate of increase, the Medicare coverage requirements and the overwhelming dominance of Medicaid revenues for most nursing homes undoubtedly play some role.

SNF's are required to file detailed Medicare cost reports, developed for hospitals, although facilities with small Medicare case loads may file abbreviated cost reports. The required reporting of expenses on a cost-center basis (maintaining statistics for cost finding) and the time and expense of preparing the cost report may discourage facilities from participating in Medicare (Feder and Scanlon, 1981). The current burden of cost reporting associated with Medicare participation is disproportionate to the generally small Medicare market share. Although drastic reductions in reporting burden are possible under some prospective payment systems (e.g., flat- or class-rate systems), other prospective payment options (e.g., facility-specific rates trended forward by inflation) require substantial cost reporting.

An inevitable consequence of a retrospective, cost-based reimbursement system is that Medicare intermediaries disallow some costs months and, sometimes, even years after the close of the SNF's accounting period. Because Medicare reimburses only for actual cost incurred, there is no cushion against losses that occur when expenses are subsequently disallowed. Most disallowances, however, are small.

Prospective payment has also been advocated as a means to increase SNF participation in the Medicare program and thereby improve beneficiary access. Increased SNF participation could potentially increase the use of Medicare SNF services and decrease the number of hospital patients awaiting SNF placements.

The very great interstate variations in the use of Medicare SNF's, however, suggest that local or regional factors greatly influence access to Medicare SNF services. For example, States with Medicaid reimbursement systems provide strong incentives for nursing homes to become certified as intermediate care facilities (ICF's); these States tend to have nursing home industries that are predominantly ICF oriented. Because Medicare constitutes such a small share of the overall market, it has little leverage to affect the availability of SNF-level nursing home care.

Other local and regional factors that affect Medicare SNF participation and the use of Medicare SNF services are the following: variations in local medical practice patterns; the availability of home health services as an alternative to SNF care; and differences (in light of these local and regional factors) in the interpretation and application of coverage rules by Medicare fiscal intermediaries.

With respect to the problem of the backlog of hospital patients awaiting nursing home placement, existing evidence suggests that most are awaiting Medicaid, not Medicare, placements (Gruenberg and Willemain, 1982). However, the Medicare hospital PPS may cause an increase in the use of Medicare SNF services because PPS gives hospitals a strong financial incentive to discharge patients sooner. Thus, hospital prospective payment may increase demand for Medicare SNF care. It would, therefore, be desirable to have a payment system that encourages facilities to admit Medicare patients.

Case-mix measures

In a Medicare SNF prospective payment system, incorporating case-mix adjustments for different patient needs is critical to ensure equitable payment to providers and access by severely ill patients. Case-mix measurement is a generic term referring to many approaches for determining the amount of resources required by different patients. To the extent that individual patients require different amounts of resources, a prospective payment system for SNF's, like the one recently implemented for hospitals, should allow for differential payment rates based on patient needs. If prospective rates are set without regard to case-mix, providers could profit by admitting only patients with the lowest resource needs, thereby limiting access for more disabled patients. Providers targeting their services to the most disabled would be disadvataged rather than rewarded by such a system. Such a result would be undesirable from the perspective of patient access and provider equity.

Specific research on the case-mix of Medicare SNF patients is very limited, primarily because they make up such a small part of the nursing home population. The existing research on case mix and resource use in nursing homes has focused on the general, long-term nursing home population; thus, these results may not be directly applicable to Medicare SNF patients. This research indicates that limitations in activities of daily living (ADL) such as bathing, dressing, and feeding are most important in predicting resource consumption and related costs (Stassen and Bishop, 1983). Diagnosis is much less important.

Although prior nursing home research suggests that diagnosis per se is not a comprehensive measure of case mix, two factors make an additional assessment of this characteristic desirable. First, the Medicare SNF benefit was designed to function as a substitute for inpatient hospital care, and the Medicare SNF patient is expected to use nursing homes for short-term restorative care rather than for long-term care. Diagnosis may, therefore, be a better predictor of resource use among Medicare patients than among Medicaid or private pay patients who use nursing homes for long-term care. Second, diagnosis is the only patient characteristic other than age and sex that HCFA routinely collects. Hence, the feasibility, at this time, of incorporating case mix in a prospective payment system is largely determined by the utility of diagnosis as a case-mix measure.

Medicare program data on SNF diagnoses and their relationship to length of stay, Medicare payment per day, and charges per day are presented in Table 6. The large standard deviations in charge per day and reimbursement per day suggest that diagnoses are not good indicators of resource use. It is apparent that other factors, such as disability, are operating to affect the broad distributions of these variables. As a consequence, the incorporation of a diagnosis-based case-mix adjustment in a PPS for Medicare SNF's appears to be impractical.

In the absence of sufficient data to derive a direct patient-specific case-mix measure for Medicare SNF patients, an evaluation of existing facility data that might provide a proxy case-mix measure, based on facility characteristics, was undertaken. As shown on Table 5, the percentage of Medicare days is directly related to cost and could be used as a proxy case-mix measure. A 1-percent point increase in the proportion of Medicare days in a facility increased the per diem routine operating costs by 30 cents in 1980. The percentage of Medicare days measures the extent to which facilities provide care to short-term skilled and rehabilitative patients rather than to long-term care patients. This finding is consistent with other analyses that indicate that Medicare patients have, on average, more frequent and severe medically oriented problems (Shaughnessy, Kramer, and Schlenker, 1983a; Shaughnessy, Schlenker, and Kramer, 1983b; Sulvetta and Holahan, 1984). Thus, while not as powerful a case-mix measure as DRG's for hospitals, the percentage of Medicare days could be used as a limited proxy case-mix measure until sufficient data are collected and anlyzed to develop a direct patient-specific case-mix measure.

Hospital-based and freestanding facilities

The substantially higher costs of hospital-based facilities has been an area of policy importance in the last several years as Congress and the Reagan administration have sought to make Medicare a "prudent buyer." If hospital-based facilities do not serve the more disabled patients or provide higher quality care, then the cost differential is not justified and should not be recognized by Medicare.

The average costs for hospital-based and freestanding SNF's by major cost categories are presented in Table 4. In 1983, the total estimated cost per diem of hospital-based SNF's ($131) was twice as high as that of freestanding facilities ($67). This

Table 6
Medicare skilled nursing facility admissions, length of stay, charges, and reimbursements, by most prevalent diagnoses: Calendar year 1980

Diagnosis	ICD-9-CM[1]	Percent of admissions	Length of stay in days	Average charge per day	Average reimbursement per day[2]
Total		100.0 [3](278,849)	29 (26)	$74 (45)	$42 (33)
Cerebrovascular disease	436x	13.4	35 (29)	76 (43)	41 (28)
Unspecified part of neck of femur, closed	8208	11.9	34 (25)	73 (39)	42 (30)
Congestive heart failure	4280	3.6	22 (22)	70 (44)	41 (28)
Coronary artherosclerosis	4140	2.7	26 (25)	64 (33)	36 (23)
Diabetes mellitus	2500	2.0	31 (28)	67 (42)	37 (73)
Pneumonia	486x	1.8	23 (23)	66 (42)	37 (29)
Petrochaneteric fracture closed	8202	1.6	36 (26)	72 (36)	41 (27)
Chronic airway obstruction	496x	1.5	23 (23)	79 (55)	42 (29)
Shaft or unspecified part, closed	8210	1.4	37 (27)	75 (40)	42 (30)
Urinary tract infection	5990	1.2	26 (25)	58 (28)	34 (26)
Mental disorders following brain damage	3109	1.2	29 (28)	60 (33)	33 (23)
Malignant neoplasm of bronchus and lung	1629	1.1	22 (22)	74 (50)	44 (27)
Deformities of other parts of limbs	7368	1.1	38 (29)	79 (49)	48 (37)
Decubitus ulcer	7070	1.1	43 (33)	75 (49)	41 (28)
Unspecified orthopedic aftercare	v549	1.0	35 (27)	80 (42)	47 (35)
Osteoarthrosis	7159	0.8	23 (21)	91 (51)	54 (39)
Unknown	7999	2.7	17 (16)	87 (59)	56 (38)
All others		49.1	27 (25)	74 (47)	43 (34)

[1] *International Classification of Diseases, 9th Revision, Clinical Modification.*
[2] Does not include beneficiary cost sharing.
[3] Number of admissions.

NOTE: Standard deviations are shown in parentheses.

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare Statistical System.

two-to-one ratio is recorded for almost all cost categories. Hospital-based and freestanding SNF's in rural areas are more similar in cost structure than they are in urban areas (not on table).

Believing the cost differential to be unjustified, TEFRA mandated that Medicare pay no more for SNF care to hospitals than would be paid using only the cost experience of the presumably more efficient freestanding facilities. These single limits had a major impact on hospital-based facilities, reducing estimated fiscal year 1983 Medicare revenues by 36 percent. It is estimated that 84 percent of hospital-based facilities exceeded the single limits.

Concerned that these reimbursement reductions for hospital-based facilities might adversely affect access by Medicare beneficiaries and the financial health of some hospitals, Congress twice retroactively postponed the effective date of these cost limits. More recently, the Deficit Reduction Act of 1984 formally rejected the concept of single limits and established a new, somewhat more generous system of cost limits for hospitals. These new SNF limits lessen the impact on hospitals, but do not take into account all of the cost differences as justifiable. The SNF limits in the Deficit Reduction Act reduce estimated fiscal year 1983 hospital-based SNF Medicare revenues by 22 percent, with 52 percent of all facilities exceeding the cost limits.

Sufficient information is currently not available to definitively quantify the proportion of the cost differences that can be attributed to the various factors such as unmeasured case mix, quality of care, and inefficiency. The bulk of the evidence, however, suggests that there are some case-mix differences between hospital-based and freestanding facilities, with hospital-based facilities caring for more disabled patients.

The percentage of Medicare days, a proxy measure for case mix, is associated with higher costs; on average, hospital-based SNF's have twice the percentage of Medicare days as do freestanding SNF's. Medicare program data on staffing patterns indicate that hospital-based SNF's have more nursing hours, more licensed nurses, and more rehabilitation therapists than freestanding SNF's, suggesting case-mix differences between the two types of facilities.

Shaughnessy, Kramer, and Schlenker (1983a,b) studied patients in high Medicare utilization SNF's and found hospital-based patients to be characterized by more severe medical problems (e.g., recovery from surgery, shortness of breath, intravenous catheters). Patients in freestanding SNF's tended to have more mental status problems, terminal illness, and urinary tract infections. An analysis of case mix, using data from the Medicare and Medicaid Automated Certification System, found that higher proportions of patients in hospital-based SNF's compared with those in freestanding SNF's had disability problems and needed specialized services (Sulvetta and Holahan, 1984). Three studies of mostly low Medicare utilization facilities found differences in the case mix of hospital-based and freestanding SNF's, with most of the evidence pointing toward greater severity of illness and disability in hospital-based patients (Cameron and Knauf, 1982; Sulvetta and Holahan, 1984; Shaughnessy, Schlenker, and Yslas, 1982). Mor and Sherwood (1983) found virtually no differences in Medicare diagnoses and disabilities between hospital-based and freestanding facilities in Oregon; they found slight differences in Massachusetts. In both States, hospital-based patients tended to be more rehabilitation oriented.

Conclusions

In designing a Medicare prospective payment system for SNF's, three major factors must be considered. First, the key to the development of the Medicare hospital PPS is the existence of a valid and reliable patient-specific measure of resource utilization, i.e., diagnosis-related groups. Without a case-mix adjustment, hospitals caring for more disabled patients who require more costly care would be financially disadvantaged and access for such patients would be impaired. The same dynamics would also exist for SNF's.

Unfortunately, no reliable and valid patient-specific case-mix measure analogous to DRG's exists for Medicare SNF patients. Proxy measures of case mix, e.g., percentage of Medicare days, have been found to be related to cost, but they are far less powerful than DRG's in accounting for variations in resource utilization.

Second, the Medicare hospital PPS will change the incentives for acute care institutions; this may, in turn, affect Medicare SNF's. Because hospital payment is now on a per case basis rather than a per diem basis, hospitals will have incentives to keep patients in acute care settings only as long as is medically necessary. Thus, some observers predict that hospitals will discharge more patients to Medicare SNF's. Similarly, hospitals may discharge sicker and more disabled patients to SNF's, patients that previously might have been retained in acute care settings. Thus, the historical experience of the Medicare SNF benefit and of the SNF's participating in it may not be a good predictor of future utilization, cost, or case mix.

Third, Medicaid, not Medicare, dominates the nursing home industry. Although there are some SNF's that are heavily dependent on Medicare revenues and are important to the Medicare program, these SNF's are a small minority of nursing homes. Thus, unlike hospitals where Medicare has a large market share in virtually all facilities, Medicare SNF prospective payment is likely to have only a modest impact on nursing home behavior.

In conclusion, prospective payment for skilled nursing facilities is an option for reimbursement reform that Congress will be considering as part of its continuing effort to restructure Medicare reimbursement. Care must be taken, however, to tailor any SNF reimbursement system to the unique characteristics of the nursing home industry and the role of Medicare in it.

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Legislative Update

The following is the text of a statement made by William L. Roper, M.D., Administrator of the Health Care Financing Administration, before the Committee on Finance, U.S. Senate, on June 3, 1986. He discusses concerns about quality of care under the Medicare program and his commitment to ensuring that every Medicare patient receives high quality, medically necessary care. He delineates the mechanisms and activities that the Health Care Financing Administration uses to assure quality, new methods that are being explored, and the research program emphasis on the impact of the prospective payment system on quality as well as possible refinements to the system.

Introduction

I appreciate this opportunity to discuss current concerns about the quality of care provided under the Medicare program. I am strongly committed to the goal of quality care and will take whatever steps necessary to assure that goal is achieved. Since I became the Administrator of the Health Care Financing Administration (HCFA), much of my time has been spent on the quality issues before this Agency. Secretary Otis R. Bowen and I have spent time shaping the Agency's budget to direct emphasis on quality. I have also been meeting with my senior staff to look closely at our current quality safeguards, to identify any potential problems that may exist and, where they exist, to begin to develop a strategy for closing any gaps. To further enhance the ongoing HCFA quality effort, I plan to convene a symposium on quality of care issues. The symposium will focus on approaches for measuring quality of care. This is a necessary first step in order to accurately come to grips with this important issue and aggressively implement programs to guarantee high quality care for all Americans. We are gathering the foremost experts in the quality of care field to advise us in this critically important area.

The Health Care Financing Administration will continue to address the issue of the quality of care provided to Medicare beneficiaries. I am not satisfied that we have done all that we can do. I am concerned not only about how well we are assuring quality for the Medicare population as a whole; but I am also concerned that not one beneficiary suffer for lack of care that should have been provided under Medicare or as a result of poor quality care.

First, I will discuss my concept of the Medicare program's responsibilities and the concerns about quality that are foremost in our minds. Second, I will detail what HCFA is currently doing to assure quality and our plans for the future.

As you know, Medicare was created as an insurance plan to meet the acute care needs of our Nation's elderly. The statute provides for coverage of acute hospital care and post-hospital extended care services, limited to the provision of skilled services in a skilled nursing facility or in the patient's home through a home health agency.

Medicare patients are appropriately discharged from the hospital earlier, but this is a process that began before the prospective payment system (PPS). Just as before, patients are in a medically stable condition when discharged, but may still require some care to assist them with activities of daily living, such as bathing or preparing meals. Care of this nature is not considered skilled and is not covered by the Medicare program.

The Administration has proposed to increase the opportunity for beneficiaries to enter comprehensive health care delivery systems paid on a per capita rate. Under capitation, providers furnish a continuum of case-managed care, frequently with a larger benefit package than available under the traditional Medicare program, for the same or slightly higher cost.

Let me briefly outline the major mechanisms used to assure that beneficiaries receive quality care. Then I will expand on each of these and give you an overview of our goals for further progress in this area.

Quality mechanisms

There are five major mechanisms that HCFA utilizes to ensure quality:

- We perform onsite inspection of Medicare providers to ensure that basic health and safety standards are met and that providers are capable of providing quality services.
- We have peer review organizations (PRO's) that review inpatient hospital care provided under Medicare to assure that it is medically necessary, delivered in the appropriate setting, and meets professionally recognized standards of care.
- We have recently brought within HCFA the Office of Health Maintenance Organizations which ensures that a health maintenance organization (HMO) meets Federal qualification requirements before it can participate in the Medicare program and monitors the HMO's to ensure continued compliance with these requirements.
- We have an Office of Beneficiary Services which ensures that beneficiaries understand their Medicare coverage and their rights under the program.
- We have an extensive ongoing research effort that is focusing on the impact of PPS on quality and exploring ways to refine PPS to ensure that facilities are adequately compensated for care provided the most severely ill.

Survey and certification

A major component of our quality assurance program is the survey and certification process which has been in place since Medicare was originally enacted. This activity protects the health and safety of individuals in every type of health care facility participating in the Medicare and Medicaid programs. We devote a large measure of our resources, about 10 percent, to support the activities of approximately 3,000 State surveyors nationwide. There are about 350 Federal staff, 275 of which are located in our regional offices, to oversee and insure the effectiveness of this process.

Under contract with HCFA, State agency surveyors inspect providers to determine the extent and degree to which each facility is in compliance with the regulatory requirements, and to obtain an overall evaluation of a facility's performance and effectiveness in providing appropriate and safe patient care. Identified problems result in a statement of deficiencies for which the facility must submit a written plan of correction. This information is the basis for conducting followup or monitoring surveys to ascertain progress and assist the facility in carrying out its care requirements. If the facility has more serious compliance problems, it is terminated from the Medicare program. Because it can limit access to care, termination is the last resort, but we will not hesitate to exercise our authority and terminate facilities that do not provide consistently high quality of care. During fiscal year 1985, 71 hospitals and 133 skilled nursing facilities (SNF's) were terminated from participation in the Medicare and Medicaid program for lack of compliance. In order to expedite the termination of substandard facilities, we implemented revised termination procedures in December 1985. These new procedures will accelerate the process for terminating facilities with immediate and life-threatening situations and set time limits for all steps in the termination process.

Although the current survey system has had a high degree of success in assuring appropriate care in a safe environment, it is primarily focused on the facility itself. Is the building in good repair? Are the rooms large enough? Are doors wide enough to permit entry of wheel chairs? Also, staffing and written policies are evaluated. This focus assumes that if the structures are safe, if qualified staff are properly utilized, and if appropriate processes are in place, then good care will be provided.

In other words, the current survey process has had limited focus on the patients. We believe that the focus rightly belongs on the patients. Have their needs been assessed? Have services been ordered by their physician to address those needs? Have these services been delivered? Finally, what is the outcome of the delivery of services? We have revised the survey process for nursing homes and are about to implement a new survey tool, the patient care and services (PaCS) assessment, which will enable us to answer these questions for patients in these facilities. Among other activities, this innovative survey tool will:

- Provide an indepth review of care. This review will be accomplished through actual observation of the care being provided.
- Evaluate facility food service. Are meals dietetically appropriate? Are they served attractively and at appropriate temperatures? Is assistance provided when needed?
- Evaluate drug administration. Are drugs administered according to the physician's orders?

A notice of proposed rulemaking was published in the *Federal Register* on October 31, 1985, providing the opportunity for public comment on this tool. The final rule should be published in the near future.[1] Although this new survey process will still ensure compliance with all Federal health and safety requirements, PaCS is an innovative, patient-centered survey system which will also provide a more valid estimate of the quality of care furnished by the facility. We are confident that this new process will improve our ability to assess quality of care.

We plan to expand our efforts in outcome-oriented surveys and are developing patient-centered survey tools for home health agencies, end-stage renal disease facilities, psychiatric hospitals, and intermediate care facilities for the mentally retarded.

We have also undertaken a major revision of the requirements hospitals must meet in order to provide care under the Medicare program. One of the primary purposes of these revised conditions of participation is to strengthen patient health and safety requirements.

We have included in this revision a new condition that will require the hospital to establish a hospital-wide quality assurance program aimed at identifying and correcting patient care problems. Hospitals will be required to evaluate all medical and surgical services and take appropriate remedial action, documenting the outcome of that action. In addition, we feel strongly that appropriate discharge planning is essential to total patient health and that this is a function that a hospital should provide. Therefore, the quality assurance condition will also require hospitals to have an effective, ongoing discharge planning program to facilitate the provision of appropriate post-hospital care.

We have expanded the survey process for home health agencies to include visits to the homes of patients receiving home health services. In the past, the home health survey activity was focused on the agency itself: Was the agency capable of providing services? Now, visits to beneficiaries in their homes will allow the surveyor to:

- Talk to the patient and the patient's family about the care being received.
- Verify that care conforms to the physician's orders and is provided according to the plan of treatment.

This is an important step to assure that home care patients are receiving appropriate and high quality services.

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[1] Final rule published on June 13, 1986 on pages 21550-21558 of the *Federal Register*.

Peer review organizations

In passing legislation to reform the Medicare hospital payment system in 1983, Congress presented an enormous challenge to our Department in the implementation of PPS. One of the most crucial objectives throughout the payment reform process has been to maintain the quality of and access to care for our beneficiaries. The potential for unique problems in quality of care under PPS, in part, motivated the Congress to strengthen the peer review process.

During the first PRO contract period, the emphasis was placed on the potential negative impact that reimbursement incentives in PPS could have on quality and utilization. PRO's were directed to review admissions, readmissions, transfers, and outliers and to focus on possible premature discharge. All PRO's were required to identify area-specific utilization and quality problems and to address these problems through achievement of objectives. These objectives provide a way to measure PRO performance and effectiveness.

Just as we continue to monitor and refine PPS to ensure that payment levels support delivery of high quality care, we must also continue to monitor and refine the PRO quality assurance program. This medical review system is a complex, dynamic system and we have learned much during the first 2 years of PRO review. We are using this experience to refine PRO review in order to further assure that Medicare beneficiaries receive high quality, medically necessary care in the appropriate setting.

What did we learn during the first PRO contract period and what is our future direction in continuing to assure quality of care? Briefly, we learned that we needed:

- To redefine PRO efforts in all areas of quality review.
- To expand our review in the area of premature discharge.
- To further focus PRO review on poor performing providers and practitioners.
- To expand our efforts to assure that beneficiaries and their families understand their rights.

We have addressed each of these issues. We have expanded the PRO's scope of work for the 1986–88 contract period to require PRO's to subject every case they review to a generic quality screen to look at:

- The adequacy of discharge planning. Were arrangements made for necessary care and services upon discharge?
- Medical stability at discharge. Were the patient's temperature and other vital signs normal?
- The presence of nosocomial infections. Did the patient acquire an infection while in the hospital?
- Trauma suffered in the hospital. Did the patient suffer a fall in the hospital?
- Unplanned return to surgery. Was the patient returned to surgery to correct an operative problem?
- Deaths. Was the death during or following surgery? Was a death on a regular floor unit unexpected?

PRO's will continue to review all transfers to other hospitals and exempt units to identify problems with inappropriate transfers. Review of readmissions has been expanded to all readmissions within 15 days of discharge instead of 7 days as required in the first PRO contract period. We believe that review of readmissions within 15 days is the most appropriate timeframe within which to determine whether a problem exists within a facility. Although review for a period beyond that might pick up additional readmissions, we do not believe that it would identify more facilities that have a systemic problem. Instead, we would begin to see cases of appropriate readmission for chronically ill patients.

Over 10 percent of all PRO review will be intensified review of providers that are poor performers or in response to identified problem areas. In all cases where a PRO finds poor quality, corrective action will be taken, ranging from education of the individual physician or hospital, to intensified review, to payment denials, and ultimately to exclusion from the Medicare program.

Provisions in the Consolidated Omnibus Budget Reconciliation Act of 1985 (COBRA) expanding the PRO's authority to deny payment for poor quality care will further increase the effectiveness of PRO's. We will meet with a physician panel to discuss appropriate guidelines and criteria for denial of payment for substandard care and expect to implement this provision in 1987.

Another COBRA provision requiring PRO's to perform 100 percent pre-procedure review of at least 10 elective surgical procedures performed on an inpatient or outpatient basis, will further assure that Medicare beneficiaries are not subjected to unnecessary surgery. We will be consulting with physicians groups to determine what procedures to subject to this review. We expect to implement this program in January 1987.

A continuing concern of both Congress and the Administration has been the potential for premature discharge under PPS. We share this concern and the new PRO scope of work will enable us to address this issue more effectively. The Medicare program emphasizes that patients should remain in the hospital until they are well enough to be released. We do know that there have been cases of premature discharge and we investigate each case and take appropriate action. Even one case of premature discharge is too many and we are committed to the strongest possible action, based on the circumstances of each case, when we learn of any instances of poor quality care.

Office of Health Maintenance Organizations

The move toward capitation through HMO participation in the Medicare program is an historic turning point. It marks a decisive move away from intrusive regulatory schemes for controlling costs to an approach that utilizes increased competition and consumer choice. The Secretary's recent transfer of the Office of Health Maintenance Organizations to HCFA appropriately places their ongoing, HMO quality assurance mechanisms under the same organization as the Medicare program.

As part of the requirement for Federal certification, HMO's must have a quality assurance program that stresses health outcome. The Office of Health Maintenance Organizations monitors these plans to assure that this program is in place and functioning. In addition to this traditional regulatory method of monitoring quality, the Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA) provided a market-based approach. To qualify for a contract with Medicare, an HMO must also have at least 50 percent of its enrollment in commercial business. This provision assures that an HMO can demonstrate its ability to meet the rigors of the market before it is eligible to enter into a contract to provide services to Medicare enrollees.

To be able to attract and retain commercial business, the plan must demonstrate that it:

- Can deliver high quality services.
- Has effective medical and financial management.
- Has good relations with the provider community.

If a plan cannot meet the demands of the market, it cannot enter into a contract with HCFA. This requirement provides a nonintrusive incentive to maintain high quality care. In addition, COBRA requires the review of the quality of services furnished by HMO's.[1] The HMO industry is in the process of developing its own quality assurance capabilities. We support this concept and we have begun a discussion with a number of these organizations to provide assistance and support for a private sector approach.

Office of Beneficiary Services

Another area that has concerned us is beneficiary education about PPS, PRO review, and the rights of patients to an appeal. Since the implementation of PPS, we heard from Medicare beneficiaries and their families that they had been told that a patient must be discharged from the hospital once the "DRG is up" or because their "Medicare days are up." Clearly, this is not the case. The PPS system is based on payments which, on average for a DRG, will be adequate to cover the utilization of services. Some patients will have stays below the average, others above it. It is the responsibility of the hospital to provide all necessary services regardless of the length of stay.

In order to increase beneficiary understanding of this fact, we have instructed all hospitals to give beneficiaries information upon admission about their appeal rights. In late February, a letter "an important message from Medicare" was provided to all fiscal intermediaries for distribution to Medicare providers who must give it to beneficiaries upon admission. We have instructed PRO's to monitor hospital compliance with the distribution of this information to beneficiaries. In addition to this beneficiary letter, we are revising and consolidating the pamphlets which explain the appeals provisions under Medicare. We are also developing a new pamphlet to better educate Medicare beneficiaries and their families regarding hospital stays under PPS. The 1986 edition of *Your Medicare Handbook* has already been revised to include additional current information on a number of relevant topics, including appeal rights, PPS, and the role of the PRO. We have issued "Medicare/Medicaid Notes" to beneficiary groups to explain, among other topics, PPS and their appeal rights. We are also providing these "Notes" to the Administration on Aging for distribution to their Area Agencies on Aging.

Finally, we have included in the 1986-88 PRO scope of work a community outreach program to help beneficiaries understand the role of the PRO and their appeals rights. We will continue to work with groups interested in developing informational publications on the appeals process. We will continue to use every avenue available to us to assist our beneficiaries in becoming their own best advocate.

Research efforts

We have many research activities in the area of quality. One of these studies, being conducted by our Office of Research and Demonstrations, focuses on the effects of PPS on a broad range of patient care outcome and hospital utilization indicators. Among the indicators being studied are: discharge rates, hospital days of care rates, length of stay, population-based mortality rates, and post-admission mortality rates.

We have contracted with health care research firms for completion of four other research projects:

- A study by the Commission on Professional and Hospital Activities to measure the general effects of PPS on the quality of inpatient hospital care, primarily by examining changes in hospital usage and treatment patterns and their effects on inpatient and discharge status.
- Two studies by the Rand Corporation: one to evaluate the impact of PPS on the quality of care by assessing potential effects on changes in inpatient hospital treatment patterns through a thorough examination of the medical record, and resultant health status outcomes; and one to develop improved methods for monitoring hospitals on an ongoing basis.

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[1] In effect, COBRA extended PRO review authority to include review of some or all of the professional activities for which payment under Medicare is made to health maintenance organizations (HMO's) and competitive medical plans (CMP's). OBRA of 1986 is more specific in that it requires each PRO contract, as of April 1, 1987, to include review of the quality and appropriateness of services provided by HMO's and CMP's. However, the Secretary may contract with organizations other than PRO's for the review in half of the States, provided that the States collectively have 50 percent or less of the total number of HMO and CMP enrollees. OBRA also requires that the level of review in HMO's and CMP's be equivalent, on a per enrollee basis, to the level of review effort expended on beneficiaries not enrolled in an HMO or CMP.

- A study by the Urban Institute to evaluate PPS quality impact on end-stage renal disease Medicare beneficiaries, a subset of the Medicare population generally assumed to represent an unusually high medical risk group.
- A study by Duke University and the Urban Institute of changes brought about by PPS on the use of Medicare services by the chronically impaired elderly, a sub-population who may be in particular need of post-discharge services.

Additional quality of care studies include:

- A study by the Northwest Oregon Health Systems, currently under way, to develop a method for measuring patient health status at the time of hospital discharge. This study will help us understand the functional status of patients at discharge and give us some insight into the type of patients who may require post-hospital care and the level of this need. While the instrument is not intended as a patient management tool, it may ultimately be used to determine the impact of PPS on the health status of patients at discharge.
- A major study is being planned by HCFA, in coordination with the Assistant Secretary for Planning and Evaluation (ASPE), to determine the need for post-hospital services and the availability of these services. This study would look at the appropriateness of post-hospital care services, potential barriers to these services, and program and benefit costs as well as out-of-pocket costs for beneficiaries.

There has also been concern about the need to adjust the PPS payment rate, under diagnosis-related groups (DRG's), to account for severity of illness. In developing the payment rates, we took into account data approximating the cost of medically necessary care for classes of patients with unique conditions through the use of DRG's. Outlier payment provisions were made for extremely long stays or high-cost cases. We do, however, have several studies focused on the refinement of PPS under way. We want to know, for instance:

- If the outlier payment process is sufficient.
- The degree to which DRG's properly account for severity.
- If there are significant, systematic differences between teaching and nonteaching hospitals in the complexity of diagnoses and severity of illness within DRG's.

Building better measures of severity, however, requires information that is not systematically captured in most hospitals and currently does not exist in national data sets. It should also be noted that the research community is far from a consensus about what variables, in what combination, represent patient differences that should be recognized in a payment system. We are committed to maintaining the necessary research emphasis to answer the question of whether severity of illness data can better account for case complexity than the current system.

Conclusion

Activities to assure quality of services and examine ways to improve quality is a major focus of HCFA. Every family in this country, including my own, is touched by the Medicare program. A major role of HCFA is to assure that the aged and disabled continue to receive high quality care. As Administrator, I am committed to focusing my efforts in this area.

Health Care Financing Trends

Medicare use and cost of home health agency services, 1983-84

by Will Kirby, Vikki Latta, and Charles Helbing

The home health agency (HHA) benefit[1] under the Medicare program was established by Congress, effective July 1966, to provide less expensive supplemental care to acute inpatient care. The original intent of the law was to provide lower-level acute care services, such as intermittent skilled nursing care, physical therapy, and home health aide services, in the home to reduce inpatient length of stay, thereby cutting costs to the Medicare program.

The short-stay hospital inpatient benefit, however, has dominated the use of Medicare Part A services, accounting annually for about 95 percent of all Part A expenditures. HHA services have consistently accounted for only a small share of Part A expenditures, for example, 2 percent in 1980. The infrequent use of HHA services during the first 15 years of the program is generally attributed to the nature of Medicare's retrospective cost-based system (in place until October of 1983), which encouraged hospitals to render a greater number and variety of inpatient services, because the more services they rendered the more they would be reimbursed. In addition, stringent eligibility requirements limited or precluded many beneficiaries from the use of HHA services. Under these circumstances, health care was more likely to be rendered in the inpatient setting even though, in many instances, lower level acute home care services were probably more appropriate.

In recent years, there has been a fairly substantial increase in the use of Part A HHA services, reflecting somewhat the passage of the Omnibus Reconciliation Act of 1980 (Public Law 96-499). This legislation (effective July 1981) liberalized the use of the HHA benefit by:

- Removing the limit on the number of HHA visits.
- Eliminating the 3-day prior hospitalization stay under Part A.
- Eliminating the deductible for HHA services under supplementary medical insurance (Part B).
- Permitting proprietary HHA's to operate in States not having licensure laws.

The potential use of Medicare HHA services was substantially enhanced with the passage of the Medicare prospective payment system (PPS), which became effective October 1, 1983 (Public Law 98-21). Short-stay hospitals participating in the Medicare program are now paid a predetermined, fixed rate for each inpatient stay, according to the diagnosis-related group code assigned to each patient. Under PPS, hospitals earn a profit when their costs fall below the prospective payment or absorb a loss when their costs exceed the prospective payment. Therefore, it is now in the best interest of hospitals to send patients home or to another institutional setting as soon as possible.

HHA data are provided to measure and evaluate the effect and influence of the above legislative actions. Preliminary data indicate a dramatic increase in the use of HHA services, reflecting substantial changes in the makeup of the HHA industry (the industry is expected to evolve towards more chain and provider-affiliated arrangements) and in the nature and scope of services rendered. It will, however, be difficult to accurately estimate the individual components associated with an increase in the use of HHA services; that is, to accurately attribute what proportion of the increase is a result of PPS, the Omnibus Reconciliation Act, or prior trends.

Data highlights provided in the tables are as follows:

Table 1

- The number of persons receiving HHA services increased from 0.39 million in 1974 to an estimated 1.52 million in 1984, an average annual compound growth rate of 14.5 percent (Figure 1). The user rate increased from 16 persons per 1,000 enrollees in 1974 to 50 persons per 1,000 in 1984, a difference of 212 percent.
- The number of HHA visits increased from 8.1 million in 1974 to 40.3 million in 1984, an average compound growth rate of 17.5 percent. The number of visits per 1,000 enrollees increased from 340 to 1,324, a difference of 289 percent, reflecting for the most part, the increase in the number of users per 1,000 enrollees.
- Between 1974 and 1984, total charges for HHA services under the Medicare program increased thirteenfold, from $0.15 billion to $2.0 billion, an average compound growth rate of 30 percent (Figure 2).
- During this period, reimbursements for HHA services to Medicare beneficiaries increased almost twelvefold, from $0.14 billion to $1.67 billion, an average annual compound growth rate of 28 percent.
- The average HHA reimbursement per person increased from $360 in 1974 to $1,099 in 1984; the average HHA expenditure per enrollee rose from $6 to $55.
- HHA expenditures, as a proportion of total Medicare expenditures, rose from 1.2 percent in 1974 to nearly 3.0 percent in 1984. (The data derived is not shown in the table.)

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[1] Home health services are reimbursable services under Medicare that include intermittent skilled nursing care, physical therapy, speech therapy, occupational therapy, medical social services, home health aide services, services of interns and residents, medical supplies (except drugs and biologicals), and the use of medical equipment. A home health agency visit is a personal visit to the home of a patient to provide covered medical services.

Table 1

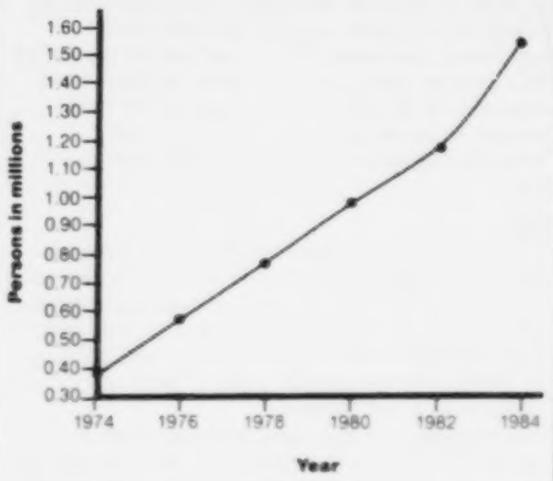
Persons served, visits, charges, and reimbursements for Medicare home health agency services, by selected years: 1974–84

	Persons served		Visits			Total charge	Visit charges				Reimbursements		
Service year	Number in thousands	Per 1,000 enrollees	Number in thousands	Per person served	Per 1,000 enrollees	Amount in thousands	Amount in thousands	Per visit	Per person served	Per enrollee	Amount in thousands	Per person served	Per enrollee
1974	392.7	16	8,070	21	340	$147,499	$137,406	$17	$350	$6	$141,464	$360	$6
1976	588.7	23	13,335	23	520	312,325	292,697	22	497	11	289,851	492	11
1978	769.7	28	17,345	23	639	500,747	474,498	27	617	18	435,322	566	16
1980	957.4	34	22,428	23	788	770,703	734,718	33	767	26	662,133	692	23
1982	1,171.9	40	30,787	26	1,044	1,296,454	1,232,684	40	1,052	42	1,104,715	943	37
1983	1,351.2	45	36,844	27	1,227	1,657,024	1,596,989	43	1,182	53	1,398,092	1,035	47
1984	1,515.9	50	40,337	27	1,324	1,982,033	1,843,706	46	1,216	61	1,666,253	1,099	55

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare Statistical System.

Figure 1

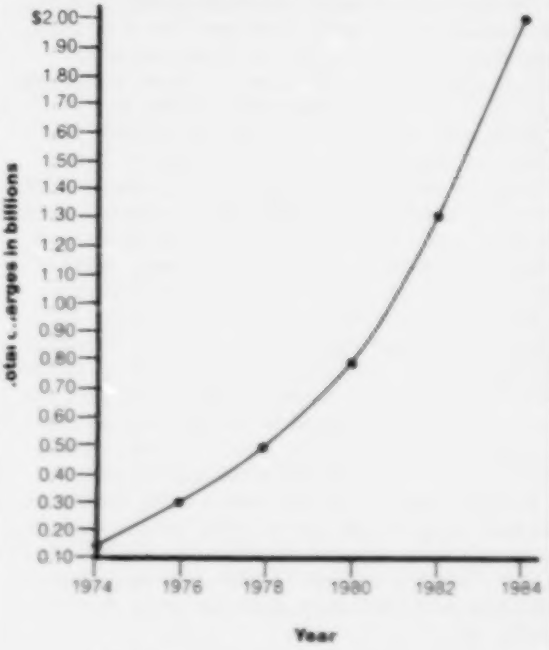
Number of persons receiving Medicare home health agency services: Selected years 1974-84



SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare Statistical System.

Figure 2

Medicare home health agency charges: Selected years 1974-84



SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare Statistical System.

Table 2

- Among the four U.S. census regions, the relative use of HHA services ranged from a low of 39persons per 1,000 enrollees in the North Central region to a high of 58 persons per 1,000 enrollees in the Northeast region, a difference of 49 percent.
- The number of HHA visits in the Northeast region was 1,646 per 1,000 enrollees, 34 percent greater than the national average (1,227 per 1,000 enrollees).
- The average charge per HHA visit in the Northeast ($38) was the lowest among the regions, 13 percent below the national average ($43). The highest average charge per visit was in the West region ($54).
- Among the 50 States, the number of persons served ranged from 12 per 1,000 enrollees in Alaska to 72 per 1,000 in Vermont and Mississippi. The average charge per visit ranged from $25 in Iowa to $64 in Alaska.

Table 3

- Among the aged beneficiaries, the number of persons per 1,000 enrollees receiving HHA services was higher for increasingly older age groups. The user rate for persons 85 years of age or over (108 per 1,000 enrollees) was more than 8 times higher than the rate for persons aged 65 to 66 (13 per 1,000 enrollees). Similarly, the number of visits per 1,000 enrollees was nearly 9 times higher for those age 85 or over (2,937 per 1,000 enrollees) than for those age 65 to 66 (326 per 1,000 enrollees). On the other hand, the number of visits and reimbursement per person were not substantially higher for older age groups.
- Females used substantially more HHA services than did males. The user rate among females (50.3 persons per 1,000 enrollees) was 33 percent higher than for males (37.8 persons per 1,000 enrollees). Similarly, the number of visits per 1,000 enrollees was 37 percent higher among females (1,386) than males (1,011). These differences between males and females in the use of HHA services held, for the most part, for each age group. There was little difference, however, in the number of visits per person for males (27) and females (28).
- Aged beneficiaries used a much higher rate of HHA services than did disabled beneficiaries. The number of persons per 1,000 enrollees receiving services was more than 50 percent higher for the aged (46.5) than the disabled (30.9); the visit rate per 1,000 enrollees was 25 percent higher for the aged (1,252) than the disabled (999). On the other hand, the disabled users (32) had a much higher average number of visits per user than did aged users (27).

Table 4

- Visiting nurses associations furnished more HHA visits than any other type of agency during 1983. They provided 12.1 million visits (33 percent of all HHA visits) to 0.46 million Medicare beneficiaries (34 percent of all persons served), an average of 26 visits per person.
- Proprietary HHA's rendered approximately 7.6 million visits (21 percent) to 0.23 million persons (17 percent) during 1983, an average of 33 visits per person. This represents a dramatic threefold increase in the use of proprietary HHA services since 1980, reflecting the legislation (Omnibus Reconciliation Act of 1980) which permitted proprietary HHA's to participate in States not having licensure laws.
- Approximately 40 percent (0.54 million persons) of all beneficiaries served received 20 visits or more under the Medicare HHA program. These persons accounted for 82 percent of all HHA visits and 81 percent of the total HHA charges.
- Proprietary HHA's had the highest number of visits per person served (33) and the highest average total charge per person served ($1,675). Hospital-based HHA's showed the highest average total charge per visit ($56).

Table 5

- Nearly 94 percent (1.27 million) of all persons served (1.35 million) received HHA nursing care services under the Medicare program during 1983. Approximately 40 percent (0.55 million) of the HHA beneficiaries served received home health aide services.
- Nursing care visits (17.8 million) accounted for nearly one-half of all HHA visits (36.8 million). Home health aide visits accounted for about 35 percent of all HHA visits.
- The average number of visits per person served ranged from 20 for combined government and voluntary agencies to 33 for proprietary agencies, a difference of 65 percent. The average charge per visit ranged from $34 for government HHA's to $53 for hospital-based HHA's, a difference of 56 percent.

Technical note

Data were obtained from billing forms submitted by HHA's for Medicare beneficiaries receiving reimbursable services in 1983. Figures shown are estimates based on a 40-percent sample of the enrolled population and are subject to sampling variability. The sample counts have been inflated to give an estimate of the utilization of HHA services for 1983.

It is estimated that approximately 95 percent of the bills received for home health services in 1983 were included. Therefore, the visit and reimbursement figures presented should be viewed as an approximation of the magnitude of differences rather than final measures of use.

Payments shown are based on interim rates that are adjusted after the end of the accounting year according to reasonable costs of operation. Retroactive reimbursements are excluded from the data in these tables. Beginning July 1, 1979, limits were placed on the amounts Medicare would pay for HHA visits. Limits are established for each type of visit and are revised each year.

Table 2

Persons served, visits, charges, and reimbursements for Medicare home health agency services, by census region, division, and State: 1983

Census region, division, and State	Persons served		Visits			Total	Visit charges				Reimbursements	
	Number in thousands	Per 1,000 enrollees	Number in thousands	Per person served	Per 1,000 enrollees	charges[1] in thousands	Amount in thousands	Per visit	Per person served	Per en-rollee	Amount in thousands	Per en-rollee
All areas	1,351	45.0	36,844	27.3	1,227	$1,657,024	$1,596,989	$43	$1,182	$53	$1,398,092	$47
United States	1,330	45.2	36,294	27.3	1,234	1,623,857	1,564,512	43	1,176	53	1,378,564	47
Notheastern States	398	57.8	11,333	28.5	1,646	444,095	435,731	38	1,094	63	390,280	57
New England	115	66.5	3,693	32.2	2,140	117,497	115,410	31	1,005	67	24,977	63
Connecticut	29	68.5	923	32.1	2,196	30,321	30,547	33	1,061	73	29,583	70
Maine	8	48.9	172	21.4	1,044	5,799	5,623	33	697	34	5,674	34
Massachusetts	57	70.1	2,053	36.3	2,542	63,374	61,755	30	1,091	76	56,675	70
New Hampshire	7	56.1	131	19.4	1,091	4,064	4,119	32	613	34	3,906	33
Rhode Island	10	66.9	307	31.5	2,109	10,937	10,378	34	1,066	71	10,627	73
Vermont	5	72.5	108	21.9	1,586	3,003	2,988	28	608	44	2,836	42
Middle Atlantic	283	54.9	7,640	26.9	1,481	326,597	320,321	42	1,130	62	234	54
New Jersey	54	54.9	1,633	30.0	1,646	60,017	59,159	36	1,087	60	58,932	59
New York	107	44.7	2,670	24.9	1,113	131,881	128,537	48	1,199	54	111,740	47
Pennsylvania	122	68.9	3,337	27.4	1,888	134,700	132,625	40	1,089	75	110,308	62
North Central States	297	38.8	7,002	23.6	916	302,290	296,654	42	1,000	39	263,324	34
East North Central	200	38.5	4,365	21.8	840	200,500	199,250	46	995	38	7,393	34
Illinois	59	41.9	1,448	24.5	1,028	74,702	73,618	51	1,248	52	59,629	42
Indiana	18	26.0	399	22.6	589	14,616	14,265	36	809	21	13,709	20
Michigan	46	42.5	1,034	22.3	946	52,465	52,304	51	1,127	48	45,048	41
Ohio	52	37.7	948	18.4	693	39,818	39,484	42	765	29	37,135	27
Wisconsin	26	39.4	536	21.0	827	18,899	19,578	37	767	30	18,625	29
West North Central	96	39.4	2,637	27.3	1,076	101,789	97,404	37	1,010	40	11,753	36
Iowa	14	31.9	306	22.4	713	7,687	7,696	25	563	18	7,729	18
Kansas	13	37.9	383	30.1	1,141	13,033	13,104	34	1,030	39	12,554	37
Minnesota	14	25.9	233	16.8	435	9,770	9,847	42	708	18	9,494	18
Missouri	45	61.4	1,486	33.3	2,048	62,041	57,980	39	1,301	80	50,245	69
Nebraska	7	32.4	146	20.1	649	6,446	5,975	41	821	27	6,539	29
North Dakota	2	23.2	46	21.9	507	1,608	1,569	34	743	17	1,461	16
South Dakota	2	21.2	36	16.5	350	1,223	1,232	35	573	12	1,158	11
Southern States	429	43.7	13,366	31.2	1,362	615,579	586,299	44	1,368	60	492,637	50
South Atlantic	222	43.5	6,631	29.9	1,301	288,179	277,349	42	1,250	54	148,743	47
Delaware	4	55.9	147	36.5	2,042	4,556	4,362	30	1,081	60	4,020	56
District of Columbia	4	52.0	101	24.9	1,294	4,138	4,335	43	1,072	56	4,104	53
Florida	105	55.6	3,518	33.6	1,869	155,909	152,547	43	1,456	81	121,638	65
Georgia	21	33.5	646	30.8	1,032	34,642	32,396	50	1,545	52	23,892	38
Maryland	22	47.1	522	24.2	1,142	24,634	24,143	46	1,122	53	23,297	51
North Carolina	25	34.5	590	23.3	802	23,565	20,707	35	817	28	23,254	32
South Carolina	16	44.2	435	27.4	1,212	16,175	15,340	35	966	43	14,830	41
Virginia	15	25.5	412	26.7	683	14,473	14,150	34	917	23	17,036	28
West Virginia	10	35.0	261	26.2	916	10,087	9,370	36	940	33	8,929	31

See footnotes at end of table.

Table 2—Continued

Persons served, visits, charges, and reimbursements for Medicare home health agency services, by census region, division, and State: 1983

Census region, division, and State	Persons served		Visits			Total charges[1] in thousands	Visit charges				Reimbursements	
	Number in thousands	Per 1,000 enrollees	Number in thousands	Per person served	Per 1,000 enrollees		Amount in thousands	Per visit	Per person served	Per en-rollee	Amount in thousands	Per en-rollee
East South Central	94	48.4	3,459	36.8	1,779	160,230	149,493	43	1,590	77	15,334	63
Alabama	23	45.3	737	31.5	1,429	31,864	31,141	42	1,333	60	24,977	48
Kentucky	14	29.7	305	21.3	632	13,312	12,185	40	849	25	11,931	25
Mississippi	24	71.9	1,050	43.3	3,117	49,943	44,550	42	1,840	132	35,142	104
Tennessee	32	52.7	1,367	42.6	2,244	65,111	61,617	45	1,919	101	50,031	82
West South Central	113	40.7	3,276	29.1	1,183	167,169	159,456	49	1,416	58	29,583	47
Arkansas	13	36.0	323	24.9	897	15,831	15,437	48	1,191	43	11,753	33
Louisiana	19	40.7	653	35.0	1,425	33,698	29,914	46	1,601	65	25,366	55
Oklahoma	14	33.3	290	21.1	702	14,347	14,415	50	1,049	35	12,045	29
Texas	67	43.7	2,011	29.9	1,306	103,294	99,690	50	1,482	65	80,392	52
Western States	207	41.0	4,593	22.2	911	261,894	245,828	54	1,190	49	232,322	46
Mountain	43	33.9	1,030	23.7	806	48,122	46,196	45	1,064	36	4,020	34
Arizona	8	21.1	155	19.7	416	8,373	7,592	49	965	20	7,393	20
Colorado	14	48.5	354	25.2	1,224	17,608	17,875	51	1,274	62	15,334	53
Idaho	4	38.1	99	23.2	883	4,478	3,908	39	912	35	4,478	40
Montana	3	29.4	63	21.1	620	2,200	2,187	35	735	22	2,140	21
Nevada	3	28.7	64	25.3	726	3,312	3,127	49	1,242	36	3,170	36
New Mexico	7	46.6	141	21.3	994	6,681	6,479	46	980	46	5,641	40
Utah	4	27.6	101	28.3	780	3,491	3,217	32	901	25	3,285	25
Wyoming	2	36.0	53	33.9	1,220	1,979	1,810	34	1,153	42	1,920	44
Pacific	163	43.4	3,562	21.8	946	213,773	199,631	56	1,223	53	4,104	50
Alaska	(3)	12.4	4	19.3	239	244	235	64	1,239	15	234	15
California	124	44.4	2,760	22.3	988	170,176	158,809	58	1,280	57	148,743	53
Hawaii	3	27.2	49	19.2	522	3,152	2,827	58	1,115	30	2,953	32
Oregon	14	39.4	273	19.5	768	15,326	14,619	53	1,043	41	14,965	42
Washington	22	44.3	476	21.2	940	24,675	23,142	49	1,031	46	22,067	44
Outlying areas[2]	21	54.2	550	26.2	1,423	33,167	32,477	59	1,547	84	19,528	50

[1] Includes charges for durable medical equipment and supplies in addition to visit charges.

[2] Includes Puerto Rico and other outlying areas.

[3] More than zero but less than 500 persons served.

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare Statistical System.

Table 3

Persons served, visits, charges, and reimbursements for Medicare home health agency services, by age, sex, and Medicare status: 1983

Age and sex	Persons served		Visits			Total charges in thousands	Visit charges				Reimbursements		
	Number in thousands	Per 1,000 enrollees	Number in thousands	Per person served	Per 1,000 enrollees		Amount in thousands	Per visit	Per person served	Per en-rollee	Amount in thousands	Per person served	Per en-rollee
Total	1,351	45.0	36,844	27.3	1,227	$1,657,024	$1,596,989	$43	$1,182	$53	$1,398,092	$1,035	$47
Age													
Under age 65	90	30.9	2,914	32.3	999	133,898	126,716	43	1,405	43	111,862	1,241	38
65-66 years	48	13.3	1,184	24.6	326	54,713	52,624	44	1,091	14	46,108	956	13
67-68 years	74	21.3	1,939	26.2	559	88,895	85,580	44	1,158	25	75,124	1,017	22
69-70 years	87	26.8	2,310	26.5	709	106,167	102,464	44	1,176	31	89,064	1,022	27
71-72 years	98	33.5	2,625	26.8	898	119,461	115,105	44	1,174	39	100,608	1,026	34
73-74 years	107	40.6	2,882	27.0	1,097	131,676	127,075	44	1,192	48	110,749	1,039	42
75-79 years	289	55.4	7,811	27.0	1,499	350,885	339,741	43	1,176	65	296,351	1,026	57
80-84 years	267	81.3	7,215	27.1	2,202	321,129	310,533	43	1,165	95	271,433	1,018	83
85 or over	292	107.6	7,964	27.3	2,937	350,180	337,152	42	1,156	124	296,792	1,018	109
Sex													
Male	481	37.8	12,863	26.8	1,011	588,163	561,774	44	1,168	44	493,025	1,025	39
Female	870	50.3	23,982	27.6	1,386	1,068,861	1,035,215	43	1,189	60	905,067	1,040	52
Medicare status													
Aged	1,261	46.5	33,931	26.9	1,252	1,523,126	1,470,273	43	1,166	54	1,286,229	1,020	47
Disabled	90	30.9	2,914	32.3	999	133,898	126,716	43	1,405	43	111,862	1,241	38

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare Statistical System.

Table 4

Persons served, visits, total charges, and reimbursements for Medicare home health agency services, by type of agency and number of visits to persons served: 1983

Type of agency and number of visits	Persons served		Visits		Total charges		Reimbursements	
	Number in thousands	Percent	Number in thousands	Percent	Amount in thousands	Percent	Amount in thousands	Percent
All agencies[1]								
Total	1,351	100.0	36,844	100.0	$1,657,024	100.0	$1,398,092	100.0
1-9	511	37.8	2,392	6.5	114,794	6.9	98,195	7.0
10-19	302	22.3	4,202	11.4	199,571	12.0	169,244	12.1
20-29	164	12.2	3,960	10.7	185,946	11.2	156,911	11.2
30-39	101	7.5	3,460	9.4	160,584	9.7	135,212	9.7
40-49	67	4.9	2,950	8.0	135,144	8.2	113,897	8.1
50-99	138	10.2	9,454	25.7	421,461	25.4	355,813	25.4
100 or more	68	5.1	10,425	28.3	439,525	26.5	368,819	26.4
Visiting Nurses Association								
Total	460	100.0	12,143	100.0	481,164	100.0	429,617	100.0
1-9	186	40.4	853	7.0	37,537	7.8	32,727	7.6
10-19	102	22.2	1,417	11.7	60,962	12.7	53,538	12.5
20-29	53	11.5	1,278	10.5	53,718	11.2	47,485	11.1
30-39	33	7.1	1,110	9.1	45,540	9.5	40,623	9.5
40-49	21	4.6	926	7.6	37,330	7.8	33,485	7.8
50-99	43	9.4	2,978	24.5	115,770	24.1	104,406	24.3
100 or more	22	4.9	3,580	29.5	130,307	27.1	117,352	27.3

See footnotes at end of table.

Table 4—Continued

Persons served, visits, total charges, and reimbursements for Medicare home health agency services, by type of agency and number of visits to persons served: 1983

Type of agency and number of visits	Persons served		Visits		Total charges		Reimbursements	
	Number in thousands	Percent	Number in thousands	Percent	Amount in thousands	Percent	Amount in thousands	Percent
Combined government and voluntary agency								
Total	18	100.0	361	100.0	15,067	100.0	14,257	100.0
1-9	8	46.3	37	10.3	1,736	11.5	1,626	11.4
10-19	4	23.3	56	15.6	2,512	16.7	2,358	16.5
20-29	2	10.8	45	12.6	1,935	12.8	1,836	12.9
30-39	1	5.9	36	9.9	1,468	9.7	1,405	9.9
40-49	1	4.0	31	8.7	1,307	8.7	1,255	8.8
50-99	1	6.7	81	22.3	3,240	21.5	3,060	21.5
100 or more	1	2.9	75	20.7	2,870	19.1	2,717	19.1
Governmental health agency								
Total	211	100.0	4,669	100.0	163,377	100.0	162,275	100.0
1-9	96	45.8	439	9.4	17,062	10.4	16,775	10.3
10-19	47	22.4	649	13.9	24,499	15.0	24,165	14.9
20-29	22	10.7	540	11.6	19,790	12.1	19,621	12.1
30-39	13	6.0	428	9.2	15,371	9.4	15,091	9.3
40-49	8	3.9	360	7.7	12,691	7.8	12,625	7.8
50-99	16	7.6	1,087	23.3	36,837	22.5	36,866	22.7
100 or more	8	3.7	1,167	25.0	37,127	22.7	37,131	22.9
Hospital-based agency								
Total	190	100.0	4,397	100.0	244,718	100.0	204,179	100.0
1-9	77	40.8	366	8.3	22,214	9.1	18,657	9.1
10-19	45	23.7	623	14.2	36,731	15.0	30,737	15.1
20-29	23	12.2	555	12.6	32,261	13.2	26,755	13.1
30-39	14	7.2	466	10.6	26,635	10.9	22,103	10.8
40-49	8	4.5	372	8.5	20,848	8.5	17,265	8.5
50-99	16	8.4	1,077	24.5	58,787	24.0	49,216	24.1
100 or more	6	3.4	937	21.3	47,242	19.3	39,445	19.3
Proprietary agency								
Total	228	100.0	7,560	100.0	381,848	100.0	303,523	100.0
1-9	68	29.6	328	4.3	17,730	4.6	13,852	4.6
10-19	49	21.6	693	9.2	36,600	9.6	28,936	9.5
20-29	30	13.3	733	9.7	38,112	10.0	30,298	10.0
30-39	21	9.1	706	9.3	36,389	9.5	29,018	9.6
40-49	14	6.3	635	8.4	32,496	8.5	25,851	8.5
50-99	30	13.2	2,078	27.5	104,040	27.2	83,110	27.4
100 or more	16	6.9	2,389	31.6	116,481	30.5	92,458	30.5
Private nonprofit agency								
Total	227	100.0	7,158	100.0	338,876	100.0	261,461	100.0
1-9	70	30.7	341	4.8	16,946	5.0	13,353	5.1
10-19	50	22.2	709	9.9	35,048	10.3	27,151	10.4
20-29	31	13.7	754	10.5	36,960	10.9	28,524	10.9
30-39	19	8.5	664	9.3	32,244	9.5	24,896	9.5
40-49	13	5.8	584	8.2	28,099	8.3	21,701	8.3
50-99	29	12.7	1,996	27.9	93,784	27.7	72,741	27.8
100 or more	14	6.3	2,111	29.5	95,796	28.3	73,095	28.0

[1] Includes rehabilitation facility based and skilled nursing facility based agencies not shown separately.

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare Statistical System.

Table 5

Persons served, visits, and charges for Medicare home health agency services, by type of visit and type of agency: 1983

Type of visit and use	All agencies	Visiting Nurse Association	Combined government and voluntary	Government	Hospital-based	Proprietary	Private nonprofit	Other[1]
Persons served in thousands								
Total[2]	1,351	460	18	211	190	228	227	18
Nursing care	1,267	436	17	201	179	208	211	16
Home health aide	546	177	6	72	64	120	100	8
Physical therapy	399	138	4	43	58	79	70	7
Other[3]	256	91	2	16	38	55	49	4
Percent of persons served								
Total[4]	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Nursing care	93.8	94.6	96.4	95.5	94.4	91.3	92.7	87.3
Home health aide	40.4	38.3	32.4	34.1	34.0	52.7	43.8	43.6
Physical therapy	29.6	30.0	25.2	20.2	30.7	34.8	30.9	38.6
Other[3]	18.9	19.8	11.3	7.6	20.2	24.1	21.6	22.3
Visits in thousands								
Total	36,844	12,143	361	4,669	4,397	7,560	7,158	557
Nursing care	17,804	5,937	190	2,380	2,285	3,362	3,397	252
Home health aide	12,799	4,152	106	1,743	1,293	2,830	2,494	182
Physical therapy	4,459	1,418	49	404	577	1,016	908	87
Other[3]	1,785	636	16	143	243	354	359	35
Percent of visits								
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Nursing care	48.3	48.9	52.7	51.0	52.0	44.5	47.5	45.3
Home health aide	34.7	34.2	29.3	37.3	29.4	37.4	34.8	32.7
Physical therapy	12.1	11.7	13.6	8.7	13.1	13.4	12.7	15.6
Other[3]	4.8	5.2	4.4	3.1	5.5	4.7	5.0	6.3
Visit charges in thousands								
Total	$1,596,989	$465,616	$14,925	$157,845	$232,789	$366,308	$327,982	$31,522
Nursing care	827,328	251,083	8,603	88,897	126,693	172,794	164,421	14,838
Home health aide	457,589	122,661	3,267	44,479	56,898	121,725	98,863	9,696
Physical therapy	216,675	61,599	2,298	15,159	34,144	52,434	46,103	4,938
Other[3]	91,642	30,248	757	5,604	15,068	19,350	18,566	2,050
Percent of visit charges								
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Nursing care	51.8	53.9	57.6	56.3	54.4	47.2	50.1	47.1
Home health aide	28.7	26.3	21.9	28.2	24.4	33.2	30.1	30.8
Physical therapy	13.6	13.2	15.4	9.6	14.7	14.3	14.1	15.7
Other[3]	5.7	6.5	5.1	3.6	6.5	5.3	5.7	6.5
Average number of visits per person served								
Total	27.3	26.4	20.5	22.2	23.2	33.2	31.5	31.3
Nursing care	14.0	13.6	11.2	11.8	12.8	16.2	16.1	16.2
Home health aide	23.4	23.5	18.6	24.2	20.1	23.6	25.0	23.4
Physical therapy	11.2	10.3	11.1	9.5	9.9	12.8	12.9	12.7
Other[3]	7.0	7.0	8.0	8.9	6.3	6.4	7.3	8.9
Average visit charge per visit								
Total	$43	$38	$41	$34	$53	$48	$46	$57
Nursing care	46	42	45	37	55	51	48	59
Home health aide	36	30	31	26	44	43	40	53
Physical therapy	49	43	47	38	59	52	51	57
Other[3]	51	48	48	39	62	55	52	58
Average visit charge per person served								
Total	$1,182	$1,011	$849	$749	$1,228	$1,608	$1,442	$1,770
Nursing care	653	576	508	442	708	830	780	954
Home health aide	838	695	573	618	883	1,014	992	1,248
Physical therapy	542	447	519	356	587	662	657	719
Other[3]	358	331	381	349	394	352	378	515

[1] Includes rehabilitation and skilled nursing facility-based agencies.

[2] Detail does not add to total because persons may receive more than one type of service.

[3] Includes speech or occupational therapy, medical social services, and other health disciplines.

[4] Because persons may receive more than one type of visit the sum of percentages are greater than 100.0.

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare Statistical System.

News Briefs

Medicare prevention demonstrations solicited

The Health Care Financing Administration (HCFA) is currently drafting a Special Solicitation for new prevention projects in response to Section 9314 of Public Law 99-272, the Consolidated Omnibus Budget Reconciliation Act of 1985, that mandates that the Secretary establish a 4-year demonstration program designed to reduce disability and dependency by providing preventive health services to Medicare beneficiaries. The demonstrations are to be conducted under the direction of accredited public or private nonprofit schools of public health, or preventive medicine departments accredited by the Council on Education for Public Health. The services to be made available under the demonstrations include: health screenings; health risk appraisals, immunizations; and counseling on and instruction in diet and nutrition, reduction of stress, exercise and exercise programs, sleep regulation, injury prevention, prevention of alcohol and drug abuse, prevention of mental health disorders, self-care including use of medications, and reduction or cessation of smoking. HCFA plans to publish this special solicitation in the *Federal Register* during the Fall of 1986. Five projects will be funded.

ICD-9-CM Coordination Committee meets

The third meeting of the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) Coordination and Maintenance Committee was held May 21-22, 1986. The meeting was co-chaired by the Health Care Financing Administration and the National Center for Health Statistics. It was attended by Federal Committee members and approximately 50 people from various public and private health-related organizations, as well as interested persons from the general public.

The Committee reviewed proposals to establish codes for new or modified technologies in ICD-9-CM. Some of these new technologies include: parenteral and enteral nutrition, pacemaker technology, lasers in medicine and surgery, percutaneous balloon valvuloplasty, ureteroscopy and pyeloscopy, ureteral stents, endoscopic biliary stone removal, percutaneous angioscopy, and gastric endoscopic balloon procedures.

Proposed ICD-9-CM classification for HTLV-III/LAV infections, including acquired immune deficiency syndrome (AIDS) was discussed. The Committee also discussed the use of a matrix that will serve as the coding index for the HTLV-III/LAV infections. After the HTLV-III/LAV codes are used for 1 year, they will be reviewed and modified, if necessary.

Individuals interested in the work of the Committee should contact Lisa Levine of the Office of Information Resources Management, Bureau of Data Management and Strategy, Health Care Financing Administration, at (301) 597-0610 or (FTS) 987-0610.

Forecast on medical care available

The May-June 1986 issue of *The Internist*, the magazine of the American Society of Internal Medicine (ASIM), sets out to explore which aspects of health care will be most likely to undergo change in the next 14 years.

According to one author, Peter D. Fox, Ph.D., vice president of Lewin and Associates, Inc., in Washington, D.C., by the year 2000 the majority of the privately insured population in this country will come under some form of "managed care," and virtually all internists will have some sort of business arrangement with health maintenance organizations (HMO's) and preferred provider organizations (PPO's).

Mark R. Chassin, M.D., an internist and senior project leader for the Rand Corporation, also predicts less autonomy for physicians in the future.

Will cost containment continue to be a major concern among policymakers and health care payers? Philip Caper, M.D., professor of public policy at Dartmouth Medical School, believes so.

Clyde J. Behney, program manager for Congress' Office of Technology Assessment, purports that the nature of the social and economic issues surrounding technologies will be a major influence on their development and their use.

There seems to be no question that the health care field will continue to change, and physicians will certainly want and need an organization that will represent their interests in the years to come. Will medical societies evolve to fill this role, or will physician unions become prevalent? Sanford A. Marcus, M.D., president of the Union of American Physicians and Dentists, believes that unions are the answer.

However, J. Paige Clousson, a labor lawyer and president of Physician Support Services, Inc., feels that unionization is not the only answer, or even the most desirable one.

Medical education is another area of medicine that must adapt and change with the times. Such is the conclusion of Robert G. Petersdorf, M.D., vice chancellor for Health Services and Dean of Medicine at the University of California in San Diego and the newly appointed president and chief executive office of the Association of American Medical Colleges.

Despite the many dire predictions about the future of medicine, *The Internist* editor William Campbell Felch, M.D., notes that "while the breadth of health care in 2000 will undoubtedly be changed, it will not differ in magnitude as the prophets of doom envision

. . . A reading of history lends credence to the generalization that the forces resisting change are nearly as powerful as those promoting it. After most revolutions, for example, there is an inevitable period of consolidation and accommodation to the changes that have been wrought; the year 2000 could turn out to be relatively placid."

Joseph F. Boyle, M.D., ASIM executive vice president, agrees with the less drastic version of the future, mainly because he has faith in this country's physicians.

For a copy of this issue of *The Internist*, send $2.00 to ASIM, 1101 Vermont Avenue, NW., Suite 500, Washington, D.C. 20005-3457. One year subscriptions are also available for $12 a year (10 issues). For more information, contact Barbara Lauter at (202) 289-1700.

National census on HMO's available

InterStudy's *1985 National HMO Census* indicates that total health maintenance organization (HMO) enrollment in 480 plans was 21,051,657 as of December 1985. This represents a 25.7 percent increase in enrollment since December 1984. According to InterStudy founder Paul Ellwood, M.D., "This is the largest percentage increase ever recorded by InterStudy. Our projections about continued growth remain on target. We are likely to see half of the U.S. population in price-competitive health plans by the early to mid-1990's." The previous record for annual enrollment growth was a 24.8-percent increase from June 1984 to June 1985.

Independent practice associations (IPA's) grew impressively in 1985 and now account for the majority (51 percent) of total HMO's and 30 percent of total enrollment. In the last half of 1985 alone, IPA's increased 35 percent in number and 38 percent in enrollment. One reason for this growth, says Dr. Ellwood, is that "the lower start-up costs and wider physician choices in IPA's are particularly appealing to the large national chains attempting to enter numerous communities."

After IPA's, staff model HMO's showed the next largest gains (up 16 percent in number of plans and 14 percent in enrollment), followed by groups (14 percent and 2 percent, respectively); the number of networks increased slightly (5 percent), but enrollment declined (2 percent).

Other findings reported in the 1985 census include:

- Hospital utilization continues to decline but may be leveling off. The average number of inpatient days per 1,000 HMO enrollees decreased less than 1 percent, from 424 to 420, between June 1984 and December 1985.
- The average monthly family premium as of December 1985 was $196.00, up 4 percent since June 1984.
- The average number of physician encounters per member in 1985 was 3.9, up from 3.7 in June 1984.
- Medicare enrollment in HMO's increased 8 percent between June and December 1985, for a total of 560,732 in 65 plans.
- While nonfederally qualified plans grew rapidly in number and enrollment in 1985, the majority (57 percent) of HMO's have Federal qualification, and they account for more than 81 percent of total HMO enrollment.
- For-profit plans increased sharply in number and enrollment in 1985; for-profits now account for 51 percent of all plans, but not-for-profit plans claim the majority (65 percent) of enrollment.

The *1985 HMO Census* can be ordered from InterStudy, P.O. Box 458, Excelsior, Minnesota 55331-0458, for $45.00. Prepayment is required.

InterStudy conducts national study of private geriatric case managers

InterStudy has been awarded $50,000 by the Retirement Research Foundation, Chicago, to study private case management services for older persons and their families. Geriatric case management services include assessment of older persons to determine their long-term care needs, care planning, services acquisition, services monitoring, and ongoing reassessment.

According to Cynthia Polich, Executive Vice President of InterStudy and Director of InterStudy's Center for Aging and Long-Term Care, "These kinds of services may very well increase the quality of life for families and older persons and help them to negotiate the disjointed long-term care system, while at the same time controlling utilization of inappropriate or more costly services. This project is the first to look at case management nationally and examine these assumptions."

The study will examine all aspects of private geriatric case management. Questions to be addressed include the following:

- Who is providing geriatric case management services, and what are their qualifications?
- What services do existing case management firms provide?
- What are the needs of older persons and their families?
- What funding sources are used to pay for these services?
- What is the relationship between private firms and other sources of case management services?
- What is the impact of the privatization of human services?
- Do private case managers relieve overburdened public case managers?

The 1-year study will include written surveys, interviews, and case studies of private firms providing case management services. Final products will include a written report and a national directory of case managers.

For further information about the private geriatric case management services study, please contact Marcie Parker at InterStudy, P.O. Box 458, 5715 Christmas Lake Road, Excelsior, Minnesota 55331-0458, (612) 474-1176.

New guide on hospital board responsibilities available

Three Waves of Change: Hospital Board Responsibilities in the New Health Care Environment, is designed to both inform and stimulate hospital. board members about how the corporatized, at-risk competitive environment is reshaping their responsibilities. It explains what board members need to know about the major forces of corporatization and alternative delivery systems—from multi-institutional systems to diversification to health maintenance organizations, preferred provider organizations, and new hospital/physician relationships. The book is designed to help boards plan strategically and preserve traditional values in a market-oriented, competitive environment and is of particular interest for new trustee orientation, board retreats and continuing education, medical staff leaders, and top management of hospital and health systems. Cost for this 90-page book is $15 per single copy, $11 for 2-5 copies, $9 each for 6 or more copies. Order number is 200.

Other publications offered by Bader and Associates, Inc. include: *The Complete Guide to Self-Evaluation of the Hospital Governing Board*, *Keys to Better Hospital Governance through Better Information*, *Trustee Folios*, and *What Hospital Board Members Need to Know About Prospective Pricing*.

For ordering information contact: Bader and Associates, Inc., Department 100, 5515 Security Lane, Suite 535, Rockville, Maryland 20852, (301) 468-1610.

Health policy doctoral program offered

The Doctoral Program in Health Policy offered jointly through Boston University and Brandeis University, and sponsored by a grant from the Pew Memorial Trust, is an intensive 2-year, multidisciplinary program leading to a Ph.D. in health policy. The program will prepare individuals for leadership positions in health policy formulation, research, and education. Six applicants each year will be selected for admission into the Boston University and Brandeis programs. Students will receive full tuition, plus a $10,000 per year stipend. For further details and applications, contact: Stephen C. Crane, Ph.D., Pew Program Coordinator, Health Policy Institute, Boston University, 53 Bay State Road, Boston, Massachusetts 02215, (617) 353-4520; or Kathy Raskin, Program Coordinator, Heller Graduate School, Brandeis University, Waltham, Massachusetts 02254, (617) 647-3186.

Department of Health and Human Services publishes inventory of health data

The fiscal year 1985 *DHHS Data Inventory*, published March 1986 by the Department of Health and Human Services (DHHS), is now available to the general public. The preparation of this inventory was commissioned by the DHHS Health Information Policy Council and the DHHS Work Group on Social and Demographic Statistics. The information will be used in carrying out policy oversight and evaluation responsibilities with respect to health data activities within the Department. The report consists of a detailed inventory of data projects, systems and analytic data bases of the Department. A subject index is provided to assist in locating projects and systems of interest. For a copy, write to the Executive Secretary of the Health Information Policy Council, Room 717, HHH Building, 200 Independence Avenue, SW., Washington, D.C. 20201.

Evaluation of the Municipal Health Services Program published

Pluribus Press has published the final evaluation report prepared by the University of Chicago entitled, "The Municipal Health Services Program: Improving Access While Controlling Cost?" Under the Municipal Health Services Program (MHSP), which was jointly sponsored by the Robert Wood Johnson Foundation and the Health Care Financing Administration, five city Governments created networks of primary care clinics with a goal to serve populations with poor access to medical care who tended to receive fragmented care in public hospitals and clinics. The clinics were to provide care at lower cost than the population's alternative sources of care. Medicare and Medicaid waivers were also provided. The evaluation indicates that MHSP did reach most, but not all, of the targeted groups. MHSP successfully replaced some outpatient departments and emergency room services. However, it failed to realize some of the program goals of continuity and high patient satisfaction. Per capita costs of medical care for MHSP users were no more than for others, but not significantly less. However, for Medicare-eligible MHSP users, costs were significantly less because of reduced hospital inpatient expenditures. Cost for this report is $27.95. To order, contact Pluribus Press, 160 East Illinois Street, Chicago, Illinois 60611, (302) 467-0424, or 1-(800) 225-3775.

Brochures address housing and care for the elderly

The American Association of Homes for the Aging has prepared a series of brochures that provide information on locating the many housing and care options available to help maintain an older person's quality of life while meeting individual needs and preferences. The series includes these titles:

"Nonprofit Housing and Care Options: An Overview," Choosing a Nursing Home: A Guide to Quality Care," "Community Services for Older People Living at Home," and "Living Independently: Housing Choices for Older People."

Any one or all four brochures are available free to consumers who send a stamped, self-addressed business-size envelope to: American Association of Homes for the Aging, 1129 20th St., NW., Suite 400, Washington, D.C. 20036. The brochures are also available at low cost to organizations that want to redistribute them free to the public. For information, contact Deborah Cloud or Evelyn Haught at (202) 296-5960.

Guides published on health services

The Leonard Davis Institute of Health Economics, University of Pennsylvania, presents two new books available under the Factpack series. *Hospital Marketing*, No. 9, provides an overview of recent industry developments in hospital marketing and strategic planning. Major sections include innovative marketing programs adopted by all types of hospitals, national surveys relating to marketing impact, and an extensive bibliography of the health care marketing literature. Cost for this paperback book is $50.00. The order number is ISBN 0-937695-00-9. *Employer Health Care Cost Containment*, No. 10, features changes in employee health benefit plans, including plan redesign, self-funding, and plan administration; worksite wellness/health promotion efforts; strategies to communicate the plan to employees; and business coalition activities. The listings of directories and periodicals are complemented by a lengthy working bibliography on all aspects of program design and management. Cost for this paperback book is $60.00. The order number is ISBN 0-937695-01-7.

Factback series publications are detailed reference guides to current health services delivery topics. Each Factpack represents a distillation of hundreds of hours of research, literature review, and discussions with experts to provide a comprehensive, one-stop guide to major trends and issues on a specific subject.

For more information, contact Jennifer Conway, Series Editor, Leonard Davis Institute of Health Economics, University of Pennsylvania, 3641 Locust Walk, Philadelphia, Pennsylvania 19104-6218, (215) 898-4750.

Health care research series books available

Two new series publications are available from Jai Press, Inc. *Research in the Sociology of Health Care, Volume 4, The Adoption and Social Consequences of Medical Technologies*, edited by Julius A. Roth and Sheryl Burt Ruzek, includes the following articles: A New Model of Medical Technology Development: A Case Study of DES; The Social Impact of High Cost Medical Technology: Issues and Conflicts Surrounding the Decision to Adopt CAT Scanners; Current Obstetrical Technologies: A Clash of Values; Medical Technology Policy: Some Underlying Assumptions; Medical Conservatism and Technological Acquisitiveness: The Paradox of Hospital Technology and Clinical Safety in the Hospital, and The Normalization of Hemodialysis at Home. The order number is ISBN-0-89232-492-9. Cost is $24.75.

Advances in Health Economics and Health Services Research, Volume 6, Biased Selections on Health Care Markets, edited by Richard M. Scheffler, is made up of three parts: Part 1. Theoretical Foundations for Understanding Biased Selection in Health Markets; Part II. Empirical Results from Health Markets; and Part III. Policy Implications of Biased Selection in Health Insurance. Cost is $28.75. For more information, contact Jai Press, Inc. 36 Sherwood Place, P.O. Box 1678, Greenwich, Connecticut 06836-1678, (203) 661-7602.

Conference on private sector involvement in health care scheduled

A conference entitled, "Private Sector Involvement in Health Care: Implications for Access, Cost, and Quality" will be held at SRI International on April 9-10, 1987, at Menlo Park, California. This conference is supported by Project Hope, the University of California at Berkeley, the Medical College of Virginia, and SRI International.

The purpose of the conference is to further understanding of private sector involvement in health care and discuss health care policy on this issue. Private sector involvement includes private financing of long-term care, private initiatives to solve the indigent health care problem, private management of public health care programs, private capital investment, the changing role of private practice of medicine, and other efforts toward more direct private sector involvement.

Papers are being sought on the theory of public and private sector participation in health care, empirical research on cost, access, or quality in programs which involve the private sector in traditional public sector roles, and policy implications of promoting programs that involve private or joint public private funding and/or delivery. Health economists, health service researchers, health policy analysts, statiticians, and methodologists who have current research on the topic are invited to submit abstracts by October 31, 1986. Individuals who wish to participate as discussants should send a letter of interest.

For more information, contact Nelda McCall, Director, Health Policy Research, SRI International, 333 Ravenswood, Menlo park, California 94025, or call (415) 326-6200.

New health care publications produced

Financing Quality Care for the Elderly is a guide to public and private financing sources for hospitals planning long-term care facilities and programs and assisting elderly people faced with long-term care needs. This guide is one in a series of three publications made possible by a grant from the Retirement Research Foundation of Illinois to the Hospital Research and Educational Trust. The series focuses on how hospitals can help the frail elderly maintain maximum independence in a community setting. Other publications in the series are *Long-Term Care Systems for the Elderly*, and *The Hospital's Role in Caring for the Frail Elderly*. Together, these publications provide hospitals and health care providers direction in planning, developing, and financing community-based, long-term care programs for the frail elderly as an extension of hospital care. Cost for the 158-page book is $25.00.

Case Management: Issues for Hospitals outlines the issues for hospital involvement in case management and can serve as a reference in the serious consideration of an approach to patient care that can offer tremendous benefits for the hospital and its community. In planning a case management system, careful distinction must be made between hospital management of transitional care services and chronic long-term services. Management of transitional care services reimbursed by Medicare is essential to help hospitals effectively provide patient care under the prospective payment system and assure appropriate, high-quality, post-hospital care. Cost for the 33-page book is $8.50.

For ordering information, contact Director of Communications, The Hospital Research and Educational Trust, 840 North Lake Shore Drive, Chicago, Illinois 60611, (312) 280-6381.

Health care ethics book available

Making Choices: Ethics Issues for Health Care Professionals, a new American Hospital Association (AHA) book edited by Emily Friedman, focuses on ethical issues that hospital executives, medical and nursing staffs, trustees, and other policymakers are currently attempting to resolve both for themselves and for their institutions. The book consists of original and landmark articles by leading ethicists, lawyers, physicians, and sociologists on such hotly debated issues as the equitable allocation of scarce medical resources and the rights of the terminally ill in treatment decisions. The book attempts to give readers a balanced perspective on both the issues and the possible courses of action.

Making Choices is divided into four parts. Parts 1 and 2 focus on the role of health care facilities as social institutions and their responsibilities to society and the community. Parts 3 and 4 focus on the roles and responsibilities of health care facilities vis-a-vis their patients. This four-part structure helps readers consider the impact of ethical decisions on both individual patients and the larger community, as well as balancing theory against implications for practice.

Part 1, "The Hospital Within Society: Theory," contains seven articles on the larger societal issues involved in the equitable allocation of limited or scarce health care resources, including the implications of rationing those resources.

Part 2, "The Hospital within Society: Practice," contains seven articles describing how specific individuals and institutions have acted on their view of their responsibility with regard to the issues raised in Part 1.

Part 3, "The Patient within the Hospital: Theory," contains eight articles that explore the ethical conflicts hospitals and physicians face in ascertaining what constitutes appropriate care of patients, especially the severely or terminally ill.

Part 4, "The Patient within the Hospital: Practice," contains six articles detailing how individuals and institutions have dealt with specific instances of ethical problems in the delivery or withholding of patient care.

The book (catalog no. 025100) can be ordered from American Hospital Association Services, Inc., P.O. Box 99376, Chicago, IL 60693, for $29.95; AHA members, for $24.00.

Annual listing of renal facilities published

A report produced by the Health Care Financing Administration, Bureau of Data Management and Strategy, entitled, *National Listing of Providers Furnishing Kidney Dialysis and Transplant Services, 1986* is now available from the Superintendent of Documents, U.S. Government Printing Office (GPO), Washington, D.C. 20402. This report contains the names, addresses, and services of Medicare approved providers of dialysis and kidney transplant services, plus additional information concerning the growth rate of renal facilities over time. It should be ordered by title and stock number 017-060-00186-1 directly from GPO. Send check or money order for $10.00 made out to Superintendent of Documents.

Staff presents papers at Association for Health Services Research Conference

Staff from the Office of Research and Demonstrations, Health Care Financing Administration (HCFA) presented the following workshops and papers at the Association for Health Services Research Conference in Boston, Massachusetts June 22-24, 1986.

The Quantitative Underpinnings of the Prospective Payment System (PPS), a workshop conducted by a panel of HCFA staff members, focused on methodologies employed in the development, analysis, and refinement of Medicare prospective payment.

The first presentation in this workshop, by Allen Dobson, described HCFA's attempts to estimate the empirical relationship between hospital cost per case and the determinants of those costs, such as case mix, location, teaching status, and labor costs. The role of this analysis in the formulation of PPS policy was emphasized.

Philip Cotterill described the use of a microsimulation model of hospital payments under prospective payment to identify and quantify the impact on different groups of hospitals of changes in the PPS payment formula. The nature of the model and the basic structure of PPS payments were presented. Some recent simulations of the impact of various provisions of the Consolidated Omnibus Budget Reconciliation Act of 1986 were also discussed.

Stuart Guterman summarized the congressional mandate for the annual report on the impact of the PPS, and described the methodology employed in evaluating Medicare prospective payment. The discussion focused on several key issues relating to PPS's impact on hospitals and the available evidence on these issues.

Patricia Willis reviewed the congressional mandate to study outlier payments and severity of illness, intensity of care, or other modifications to diagnosis-related groups (DRG's). Case-mix measurement is important to assure fair payment across hospitals and beneficiaries. Existing studies indicate that a major refinement of DRG's is not immediately at hand: alternative systems that apply standard hospital discharge data (e.g., disease staging or patient management categories) do not substantially improve upon DRG's, and systems that apply clinical or physiologic measures (e.g. APACHE or MEDISGRPS) require data collection and validation. Modest refinements of the outlier payment methodology and the DRG's will continue in the near future.

Jack Langenbrunner reviewed the issues, methods, and recent research activities undertaken to develop a prospective payment system for excluded hospitals. These hospitals include children's rehabilitation, psychiatric and long-term freestanding facilities, and rehabilitation and psychiatric distinct-part units of general hospitals. Congress mandated that the Secretary of the Department of Health and Human Services 3 years ago undertake research and analysis on whether and how these hospitals could be paid on a prospective basis. This presentation reported on work to date, and set out a preliminary policy and research agenda for the future.

James Lubitz described the studies sponsored by HCFA to evaluate the effect of prospective payment on the quality of care. He outlined methodological issues in two of the studies—aftercare and post-admission mortality.

Mortality as an Impact Measure: Issues and Results, by Paul Eggers, examined some methodological issues surrounding three measures of mortality: population based mortality, discharge mortality, and mortality within a fixed length of time from hospital admission. Population based mortality is the percent of aged persons dying within a year. It measures deaths irrespective of admission to a hospital. As such, its major weakness is one of attribution. Much of what occurs in population based mortality bears no relationship to the delivery of inpatient care. Discharge mortality is the percent of hospitalized patients dying during the stay itself. The advantage of this measure is that it targets the measure to only those patients on which the prospective payment system might have an impact. The major disadvantage of the measure is that the discharge decision is based not only on the condition of the patient but on post-hospital resource constraints as well. Thus, the measure is not consistent across geographic regions or across providers.

Fixed length admission mortality is the percent of hospitalized patients that die within a fixed length period of time from admission. It avoids the inherent bias in discharge mortality by standardizing the period of observation. In addition, the method can be extended to any reasonable length of time following the hospital stay in order to detect longer term consequences of hospitalization. As such, it is the best mortality measure of the three discussed.

A Descriptive Analysis of the PPS Outlier Payment Policy, by Stuart Guterman, described the development of the policy under Medicare PPS for additional payments to hospitals for cases that are exceptionally long or costly, focusing on the objectives of this policy. Also discussed were analyses of data on the distribution of outlier cases, charges, and payments by patient characteristics and by hospital group.

Staff presents papers at American Public Health Association Conference

Staff from the Office of Research and Demonstrations, Health Care Financing Administration (HCFA) presented the following papers at the American Public Health Association Conference in Las Vegas, Nevada, September 28 through October 2, 1986.

The Impact of the Medicare Prospective Payment System (PPS): Evidence from the Second Year, by Allen Dobson, examined evidence from Medicare administrative data and other data sources that show the changes in hospital utilization rates, practice patterns, employment levels, and revenues that coincided with the implementation of PPS. Also evaluated were additional changes that occurred as the system progressed in the transition from retrospective cost-based reimbursement to prospective payment based on uniform national rates.

Prospective Reimbursement System for Long-Term Care: An Illustration of a Case-Mix Methodology for Home Health Services, by Tony Hausner of the Health Care Financing Administration, and Kenneth Manton of Duke University, developed a case-mix methodology for home health services. A multivariate grouping methodology, the Grade of Membership Model, was applied to records from the 1982 National

Long-Term Care Survey which were linked to Part A and Part B home health reimbursements from Medicare files. This methodology identified clinically distinctive profiles of health and functional status among home health users with very different levels of home health service use. These profiles, when combined with factors describing informal care resources and local market conditions, explained significant proportions of the variance of individual differences in Medicare home health reimbursements and numbers of visit. The high level of prediction of individual home health service Medicare reimbursements strongly suggests the feasibility of developing case-mix strategies for prospective reimbursement of home health and possibly other long-term care services.

Do Medicare Health Maintenance Organization's (HMO's) Reduce Utilization?: An Analysis of Early Demonstration Project Performance, by Jeff McCombs, Judith Kasper, and Jerry Riley, provided study data that reflects the use and cost experiences of Medicare enrollees in early Medicare HMO demonstration projects and include Medicare data on utilization prior to enrollment. Multivariate statistical techniques were employed to investigate whether or not HMO's reduce the use and cost of medical care for their Medicare enrollees. Data on a sample of beneficiaries who remained in the fee-for-service sector were used for comparison. These data allowed the authors to statistically control for selection bias in their estimates of the effectiveness of HMO enrollment by using prior utilization as a measure of health status.

The Impact of PPS on Physician Behavior, by Allen Dobson, presented data from the prospective payment system (PPS) program for fiscal years 1984 and 1985. Evidence from Medicare administrative data and other data sources were presented on the relationship of observed changes in hospital performance to physician behavior. Changes in length of stay, admission rates, case mix, staffing patterns, and occupancy rates were noted and linked to PPS incentives on hospitals and physicians. The relationship of hospital behavior to other provider behavior (e.g., skilled nursing facilities, office and outpatient practices, and home health care) was explored. PPS observations were set in the context of a fast changing health care services delivery marketplace and the future of the Medicare program under capitation.

Assessing Quality of Care in the National Medicare Competition Demonstrations, by Kathleen Connors, presented an overview of the Health Care Financing Administration's National Medicare Competition Evaluation plan to assess the structure, processes, and outcomes of care received by Medicare beneficiaries who enrolled in these demonstration alternative health plans. Particular attention was given to the process of care component of the evaluation which is the first study of its kind for this population. A panel of physician experts was convened to develop criteria to evaluate basic ambulatory care, followup of laboratory findings, and the routine management of hypertension and diabetes. Two high resource conditions—colorectal cancer and congestive heart failure—were also added to compare patterns of care with Medicare fee for service.

Competitive Bidding Demonstration for the Purchase of Clinical Laboratory Services, by Paul A. Gurny, presented the Health Care Financing Administration's recent activities regarding alternative payment methodologies, specifically competitive bidding. The competitive bidding model to be tested and the clinical laboratory services to be bid were discussed. In addition, background information is provided as to why HCFA is undertaking this effort and what is expected to be learned from the demonstration.

A Study of Medicaid Utilization and Expenditures of Intermediate Care Facility for the Mentally Retarded Residents in Three States, by Margaret Hall of the Health Care Financing Administration, and Brian Burwell of Systemetrics, Inc., examined the costs and utilization of Medicaid services received by mentally retarded persons who reside in intermediate care facilities for the mentally retarded (ICF/MR's). The focus on ICF/MR program recipients is important given the considerable growth of this optional Medicaid benefit. ICF/MR expenditures grew from zero (not covered) in 1973, to over $4 billion by 1984. Today, the ICF/MR program now covers 145,000 Medicaid recipients, or approximately 60 percent of all mentally retarded persons receiving residential care in the United States. Systematic investigation of the characteristics and service utilization of ICF/MR residents has been impeded in the past by the lack of a comprehensive data base that incorporates Medicaid program information on a longitudinal, person-based format. This study examined Medicaid utilization and expenditure patterns of ICF/MR residents, from 1980 to 1982, using the uniform Medicaid "tape-to-tape" data bases in three States: California, Michigan, and Georgia. The policy implications of the findings for the States and the Federal Government were discussed.

Issues in Capitating Medicaid Services, by David Baugh, examined different issues relating to capitated programs. Due to high increases in medical costs, alternatives to fee-for-service are being implemented by many Medicaid agencies. In order to contain cost, various mechanisms have arisen to pay a fixed amount to cover services in full before care is provided. These include diagnosis-related groups, ambulatory visit groups, health maintenance and health insuring organizations, and other types of capitated programs. Two important questions to be considered in the design of any partially or fully capitated program are: What is the appropriate payment amount? How will decisions be made to identify and pay for cost outliers? First, Tape-to-Tape analyses show that at least 20 percent of all Medicaid enrollees did not receive any Medicaid services during an entire year. The proportion was lower for aged and disabled groups and as high as 40 percent for medically needy children in some States. Therefore, the appropriate way to determine payment amounts is on the basis of the full population-at-risk (enrollees) and not on the basis of only those enrollees who received services. Second, because the data are person-based, Tape-to-Tape analyses identify selected groups of high cost individuals. Their utilization and Medicaid costs are reported by type of services. This approach could be used to identify cost outliers, assess risk, and evaluate reinsurance options for prepaid programs.

Use of Medicare Services in the Last 5 Years of Life by Cause of Death, by Gerald Riley and James Lubitz, examined Medicare expenses by calendar year in the last 5 years of life for a sample of aged Medicare beneficiaires dying in 1979. Data on a comparison group of survivors was also examined. Data were presented by type of service and by cause of death, which was obtained from death certificate information and linked to Medicare claims files. This provides evidence of which major causes of death have the greatest impact on Medicare expenses. The results also focus on differences in patterns of service use through time by cause of death.

Health Care Utilization and Expenditures in the Last Year of Life: The Impact on Medicaid, by Feather Davis of the Health Care Financing Administration, David Kidder of Abt Associates, and David Klingman of SysteMetrics, Inc., examined patterns of health care use and cost across the last 12 months of life for a variety of services used by Medicaid enrollees with selected diagnoses. The types of services include inpatient hospital, inpatient surgery, physician (both in and out of hospital), nursing home, home health, and prescription drug. The diagnoses include not only six types of cancer, but also seven noncancer diseases that are both chronic in nature and leading causes of death. The data were drawn from HCFA's uniform Medicaid files (the "Tape-to-Tape" data base), developed from files furnished by selected States. Implications for the Medicaid programs were discussed.

Data on Specific Illnesses: How Illness Varies by Medicaid Population and its Impact on the Program, by Penelope Pine of the Health Care Financing Administration and Embry Howell of SysteMetrics, Inc., examined the relation of hospital use and expenditures by discharge diagnosis and by Medicaid eligibility category. Data from five State Medicaid Management Information Systems were collected and developed into a uniform person-based data set known as the Medicaid Tape-to-Tape Project. Comparisons in program use and expenditures for high cost or frequently occurring diagnosis were analyzed in context with program and health resource differences among States. Complications of pregnancy, childbirth, and the puerperium had the highest ranking for inpatient hospital expenditures in Georgia and Michigan and ranked second in Tennessee. Mental disorders had the highest ranking for inpatient hospital expenditures in New York and Tennessee. Injury and poisoning had the highest ranking in California. The diagnosis group with the highest expenditure per discharge in four of the five States was certain conditions originating in the perinatal period, ranging from $8,275 per discharge in California to $2,875 per discharge in Michigan.

The Dilemma of Work Incentives for the Disabled under Medicaid, by David Baugh, Penelope Pine, and Martin Ruther of the Health Care Financing Administration, and Roxanne Andrews and Marilyn Rymer of Systemetrics, Inc. discussed the costs of Section 1619 compared with the benefits of the program to the disabled, and the SSI and Medicaid programs. It is believed that some disabled SSI recipients do not attempt to work because they fear losing their Medicaid benefits. Section 1619 was enacted to encourage the disabled to work by continuing their Medicaid coverage. Section 1619 presents a dilemma because it contradicts SSI's strict definition of disability, the inability to be gainfully employed because of physical or mental impairment. However, Section 1619 benefits SSI and Medicaid through lower cash payments and reducing the number of disabled enrollees when they move into better jobs. The financial burden of Section 1619 to Medicaid was examined using person-level Medicaid data from the Tape-to-Tape data base for four States. Comparable Medicaid data was collected from seven additional States. The results show that Section 1619 expenditures account for less than $1 out of every $1,000 spent by Medicaid on the disabled population. Section 1619 participants have half the expenditures per enrollee as the total disabled.

Medicaid Waivers for the Mentally Retarded: An Interim Evaluation, by Gerald Adler, presented a profile of mentally retarded Medicaid clients. In 1981, Congress authorized the Secretary of Health and Human Services to waive certain provisions of the Medicaid program in order to provide home and community-based care to people who would otherwise be institutionalized under Medicaid. Almost every State has since requested one or more of these waivers to serve aged or mentally retarded people. Some 17,000 mentally retarded Medicaid clients are being served in community settings under the waiver, a significant proportion of the mentally retarded caseload. This paper presented a profile of these clients, the relative costs of serving them under the waiver program, implications for State programs, and the consequences for Medicaid. Data were from reports submitted by the States and a special survey of waiver programs.

Medicaid and the Mentally Retarded: Steps on a Winding Road, by Gerald Adler of the Health Care Financing Administration and Brian Burwell of SysteMetrics, Inc., provided an overview of the intermediate care facilities for the mentally retarded (ICF/MR) program within the context of overall Medicaid programs trends. Since 1972, when ICF/MR's became a Medicaid service, Medicaid has had an increasing influence on the nature of MR care. At the same time, MR care has had a strong effect on the Medicaid program. Increases in Medicaid long-term care expenditures are far more attributable to the growth in ICF/MR than to increased nursing home care for the aged. Medicaid costs for MR care rose to $4.2 billion in 1984; this represented 12.3 percent of program expenditures to serve 0.7 percent of recipients. The average annual cost per recipient was $30,000 in 1984, up from $16,000 in 1980. Factors accounting for the dramatic rise and recent plateau in ICF/MR utilization and costs were highlighted. Various proposals for restructuring the ICF/MR program were examined.

Comparative Analysis of Medicaid Utilization and Expenditures for Recipients of the Intermediate Care Facility for the Mentally Retarded Services in Three States: California, Georgia, and Michigan, by Penelope Pine and Margaret Hall, examined the cost and utilization of Medicaid services rendered to mentally retarded persons in intermediate care facilities (ICF/MR). Data from a uniform Medicaid person-based data set were used to study ICF/MR residents and the services they received from 1980-82 in three States: California, Georgia, and Michigan. Also discussed were findings on the sociodemographic charactertistics of the ICF/MR population, the use and cost of ICF/MR services, public and private expenditures for ICF/MR care, the utilization and costs of acute care services by ICF/MR residents, and resident movement within the ICF/MR program.

Beneficiary Impact of the Medicare Prospective Payment System for Hospitals, by Paul Eggers and Gerald Riley, examined the impact of Medicare's prospective payment system on the amount and quality of care received by beneficiaries. The data for this study came from the Medicare Statistical System, a by-product of the Medicare enrollment and claims system. Data were presented on changes in discharge rates, length of stay, and total days of care as measures of access to care. Patient outcomes were also included in the form of mortality and rehospitalization rates. Both population-based and discharge-based mortality rates were presented. Rehospitalization data focused on readmissions within 30 days of discharge and included readmissions to any hospital.

Distribution and Characteristics of Facilities for the Mentally Retarded: Preliminary Findings from a National Study, by Aurora Zappolo, presented data from the Inventory of Long-Term Care Places, a national mail census of nursing homes, personal care homes, and facilities for the mentally retarded, conducted early in 1986. The study included all known places which are formally set up as residences for the mentally retarded, without regard to size. The range of places included in the study covers such providers as licensed foster care for the mentally retarded serving one or more persons, group homes, and traditional institutions. It includes both those certified under Medicaid to provide intermediate care for the mentally retarded and noncertified providers. Approximately 25,000 addresses were included in the mailing list as facilities for the mentally retarded. Data collected in the study include numbers of beds, admissions, and residents, ownership of facility, certification, and type of provider. The data were presented by State. The Inventory was designed as a sampling frame for the 1987 National Medicial Expenditure Survey, a survey of health care utilization and expenditures of persons in households and institutions.

Financing Care for the Mentally Retarded: Research Approaches, a session presided by Aurora Zappolo, examined the long-term care program, and its cost, data from a national sample survey of mentally retarded facilities and residents, recent data from a national mail census of all facilities for the mentally retarded, a State-level perspective from the Medicaid Tape-to-Tape project, and a report on persons being served in community settings under intermediate care facilities for the mentally retarded waivers. Most studies and reports on long-term care focus on the elderly in nursing homes and, in recent years, in the community. There is increasing interest in services being provided to other chronically impaired individuals. In particular, the mentally retarded have begun to be recognized as a population of significant policy interest. This session described and analyzed this often overlooked segment of the long-term care population.

Trends in Residential Care of the Mentally Retarded/Developmentally Disabled, by Margaret J. Hall, discussed the University of Minnesota's project findings on long-term care residential services for the mentally retarded and the developmentally disabled (MR/DD). Information was gathered on the number and geographical location of facilities, their size, whether or not they were intermediate care facilities for the mentally retarded (ICF/MR) certified, ownership, and the costs of care. Data on resident charactertistics, admissions, readmissions, and discharges were also compiled. This paper analyzed changes in the care and treatment of MR/DD people from 1975 to 1982. Also discussed were analyses of Medicaid's changing role in the MR/DD area, including changes in the client population, the nature of ICF/MR's, and their costs. The major findings from this study were related to current critical policy issues in the ICF/MR program.

Children at Risk: The Uninsured and the Inadequately Insured, by Judith Kasper, presented data on characteristics of uninsured children and those with private insurance coverage. For those with private insurance, services covered and types of benefits were examined. The impact on use of different levels of coverage was discussed.

HCFA Issues in Data for Monitoring Medicare Capitation, by James Lubitz, discussed the issues concerning whether the Health Care Financing Administration (HCFA) should request data on the experience of Medicare enrollees in health maintenance organizations (HMO's). If a decision is made to request such data, this paper outlined the options on what kinds of data might be collected and how the data should be collected.

Effects of Federal Budget Trends on Health Statistics and Availability of Data by James Lubitz, discussed the major data issues concerning the Medicare and Medicaid programs and whether Federal budget trends have affected the amount and kind of data HCFA collects. Particular attention was given to Medicaid data and to data on new Medicare initiatives, such as prospective payment and capitation.

Prevention in Medicare: A Model to Determine Cost Effectiveness, by John Meitl, Arne Anderson, and Sidney Trieger, reviewed the Health Care Financing Administration's (HCFA's) current activities that plan to test the cost effectiveness of providing primary preventive services as a covered service for Medicare beneficiaries over age 65. HCFA published a special solicitation for prevention demonstrations in August 1983. From this solicitation, HCFA awarded cooperative agreements for local demonstrations to the University of North Carolina and to Blue Cross and Blue Shield of Massachusetts. The model used to determine the cost effectiveness of the projects is described and discussed. A description of the projects was given that includes the specific list of preventive services that will be provided and how each project will be implemented. Other current related HCFA prevention activities were also reviewed.

A Review of the Robert Wood Johnson Foundation/Health Care Financing Administration/National Governors' Association Program for Prepaid Managed Health Care, by John Meitl of the Health Care Financing Administration, and Vincent Cucchiara of Massachusetts General Hospital, reviewed this 3-year demonstration program that is designed to enable local medical institutions, working with State and Federal Government and private health insurers, to develop more efficient arrangements for financing and delivery of health services. A complete description of the 13 participating projects was provided including those innovative arrangements that have been developed, and the status of implementation was reviewed.

Introduction of a Variant Reimbursement System to a Medicare Health Maintenance Organization Demonstration: An Analysis of "Prior Utilization" to the AAPCC Capitation System and a Review of First-Year Operational Data, by John Sirmon and James Beebe, compared the standard adjusted average per capita cost (AAPCC) and "prior use" models and reviews results of the first-year operational data with regard to such key factors as service utilization and AAPCC/prior use reimbursement comparisons. The AAPCC formula, which is designed to derive an actuarial ratebook approach for health maintenance organization (HMO) prospective payment, has not changed since the inception of the AAPCC concept in 1972. The Health Care Financing Administration's Office of Research and Demonstrations has developed a modification to the AAPCC formula that will incorporate prior utilization of hospital and medical services for individual HMO members. This modification may result in more accurate prospective reimbursement rates for HMO's with regard to the actual membership of the HMO and their projected use of services.

Informing the Medicare Consumer: What Works, by Kathleen Farrell and Kathleen Connors, reviewed in depth, two projects financed through the Health Care Financing Administration that address the issue of health care choices with differing approaches: Health-Choice and the American Association of Retired Persons' (AARP) Informed Buyer Project. HealthChoice, using paid staff, provides marketing and brokering services for Medicare beneficiaries in three cities. AARP, using local volunteers, provides consumer education sessions and advocacy with HMO's in five cities. Additionally, an overview of State and local efforts across the Nation was provided.

Preliminary Analysis of the Aid to Families with Dependent Children (AFDC) Homemaker/Home Health Aide Demonstration, by Dennis Nugent and Kathy Ellingson, examined the operational structure, the research methodology, and the preliminary results of the Aid to Families with Dependent Children (AFDC) Homemaker/Home Health Aide Demonstration. Funded by the Health Care Financing Administration, this 4-year project was developed to study the effects of training and employing AFDC recipients to provide home care services to elderly and disabled individuals at risk of institutionalization. The objectives of the demonstration were to reduce the welfare dependency of the AFDC participants and to prevent or delay the institutional placement of the functionally impaired clients. The evaluation was designed to produce a comprehensive analysis of the costs and benefits of implementing a program of this type. Client outcome measures discussed include mortality, institutionalization, health status, and the utilization of medical services and informal support systems. The impact of the demonstration on the employment and earnings capability of the AFDC recipients was also reviewed. In addition, description of trainee characteristics and an assessment of performance during the subsidized employment period were presented.

Financial Risk-Sharing in the Social Health Maintenance Organization: The First Year Experience, by William Clark, presented results from financial reports submitted to the Health Care Financing Administration (HCFA) on a quarterly basis from participating health maintenance organizations (HMO's). Analysis of the results focused on the experiences of two of the health plans. The relationship of early losses to service utilization, organization costs, and lower than expected enrollment were explored. Modifications made by the plans and/or by HCFA to prepare for the third year of the demonstration, where plans are at full risk, were discussed.

ICD-9-CM Coordination Committee meets

The next meeting of the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) Coordination and Maintenance Committee will be held on November 19-20, 1986, from 9:30 a.m. to 4:00 p.m., in Room 703 A, Hubert H. Humphrey Building, 200 Independence Avenue, SW., Washington, D.C. The meeting is co-chaired by the National Center for Health Statistics and the Health Care Financing Administration (HCFA).

The Committee was established to review modifications of the ICD-9-CM that reflect new procedures and technologies, as well as newly identified diseases and coding problems. It was also established to promote the use of educational programs and other communication techniques toward standardizing coding applications and upgrading the quality of coded medical data.

The Committee will discuss electrical stimulation therapy, biopsies, unplantable infusion pump, hyperthermia treatment for cancer, multiple vessel percutaneous transluminal coronaryangioplasty, tissue expander of breast and other sites, ileal J pouch—anal anastomosis, Interleukin -2, hemofiltration and parathyroidectomy.

For further information, contact Betty See at (301) 594-4885 (FTS 934-4885), Office of Statistics and Data Management, Bureau of Data Management and Strategy, HCFA.

Publications now available from NTIS

The following publications are now available from the National Technical Information Service, Document Sales, 5285 Port Royal Road, Springfield, Virginia 22161, (703) 487-4650:

A Study to Develop and Test Measures of Case-Mix Complexity, Case-Mix Severity and Case Volume for Hospitals

This report describes the methods and findings from two separate studies on how the cost per case of Medicare inpatients relates to certain patient factors. Behavioral cost function analysis was used to relate cost per case to case-mix measures of various kinds, and the effects of various covariates. The other study focused on 12 homogenous surgical case types and examined how cost per case varied according to case volume when biasing variables were controlled. Both studies used 1978 data. The first study confirmed earlier studies which showed that cost per case is proportional to case mix after controlling for bed size, teaching, age levels, and city population, and that increased data quality increases the variation in case-mix indices. It also showed that Medicare case mix is not highly correlated with case mix of under age 65 patients and that case-mix diversity measures do not significantly increase explanatory power. The second study found that a 35-percent decline in discharges raised average costs per case by 10 percent. Order by accession no. PB86166972/AS; cost is $22.95 for paper copy, $5.95 for microfiche.

The Impact of Physician Supply and Regulation of Physician Fees and Utilization of Services

Blue Cross and Blue Shield of Michigan designed a study to address, in depth, behavioral issues relating to the impact of insurance on utilization and fees and the existence of physician demand inducement. A model of price inducement with downward price rigidity due to usual, customary, and reasonable reimbursement methods that key on stated charges was developed. The findings of this detailed micro-investigation of one large State have important implications for public policy. First, all of this work confirms the hypothesis that geographic disparities in the level and growth of physician services and not fees provide a major impetus to physicians expenditure growth. Second, findings about the extent of bordercrossing point to a technical problem in calculating what Medicare health maintenance organizations (HMO's) ought to be paid. As for the relationship between physician supplies and expenditures, availability alone generates more use; it may be somewhat academic whether physicians consciously shift demand, unconsciously follow established practice patterns that raise utilization, or are simply more readily available to patients. Greater physician supply, however, can be used to advantage, even though it provides no panacea by itself. As more physicians are left to divide a relatively fixed caseload (intensity per case is more variable), individual caseloads fall. This should make physicians as a whole amenable to some form of managed care, i.e., HMO's, independent practice associations, and preferred provider organizations. Under fixed payment, they should be less likely to recommend marginal care. Order by accession no. PB86166501/AS; cost is $28.95 for paper copy, $5.95 for microfiche.

Second Surgical Opinion Programs: An Analysis of Public Policy Options

This report presents findings from an evaluation of four second surgical opinion programs (SSOP's). The SSOP's evaluated included the mandatory Massachusetts Medicaid program funded by that State's Department of Public Welfare, the Health Care Financing Administration-funded voluntary Medicare demonstrations in New York and Michigan, and the National Second Surgical Opinion Program, also funded by the Health Care Financing Administration. Program participation and the frequency with which program participants decide to undergo surgery are each examined, as are the effects of these programs on surgery rates, costs, and the health outcomes of program participants. Order by accession no. PB86158326/AS; cost is $9.95 for paper copy, $5.95 for microfiche.

Physician Perceptions About the Short-Run Impact of Medicare's Prospective Payment System: Final Report

This is a descriptive statistical analysis of physicians' perception of the Medicare prospective payment system short-run impact on practitioners' inpatient hospital activity. Data from the 1984-85 National Physicians' Practice Cost and Income Survey and various secondary sources (Area Resource File; American Medical Association Physician Master File) were examined with cross-tabular analyses of physician, hospital, and national characteristics. Order by accession no. PB86165172/AS; cost is $11.95 for paper copy, $5.95 for microfiche.

A Study of the Quality and Effectiveness of Experimental Fixed-Price Medicare Part A Intermediary Contracting

This study examined the quality and effectiveness of the performance of claims processing, provider audit, and other functions under two experimental fixed-price contracts for Medicare intermediary services in Missouri and New York. These fixed-price contracts were a radical departure from the customary procedures of the Medicare program, which normally contracts with its intermediaries on a cost-reimbursement basis. The contract in Missouri was awarded competitively. The contract in New York was negotiated. The Missouri experiment was estimated to have saved from $3.8 million to $5.1 million. The New York experiment, while maintaining costs below national averages, was judged not to have achieved savings beyond what otherwise might have been expected. Neither experiment had any adverse effect on the amount of benefits paid by the Medicare program. No disruptions in service occurred in New York. In Missouri, performance met contract requirements, but there were some delays in bill processing in the beginning. There is no evidence that Missouri beneficiaries were inconvenienced by this. Hospitals experienced some initial case flow problems, but these were corrected by the Health Care Financing Administration. Order by accession no. PB86166493/AS; cost is $28.95 for paper copy, $5.95 for microfiche.

An Analysis of Medicare's Physician Participation Agreement Program: Final Report

This is a descriptive statistical analysis of the first year of the Medicare participating physician program for fiscal year 1985. Data from the 1984-85 National Physicians' Practice Cost and Income Survey and various secondary sources (Area Resource File; American Medical Association Physician Master File) were examined using cross-tabular analyses of physician characteristics. Relationships studied included physician specialty, type of financial arrangements, organization of practice, volume and work effort, Medicare dependency, assignment rates, practice costs, reasons for participation, area characteristics, and financial characteristics of patient population. Order by accession no. PB86166121/AS; cost is $16.95 for paper copy, $5.95 for microfiche.

Prospective Payment and Peer Review: Their Differential Impact on Patient Resource Use

This study evaluates the first 3 years (1978-80) of the Maryland per case prospective payment program, the guaranteed inpatient revenue (GIR) program, and the concurrent review activities of two Maryland professional standards review organizations (PSRO's) in terms of the relative impact of each program on individual patient total charges, ancillary charges, length of stay, and admission rates. Results suggest that the prospective payment program (Maryland GIR) had a significant and consistent impact in reducing charges per admission over all 3 years. Order by accession no. PB86166113/AS; cost is $16.95 for paper copy, $5.95 for microfiche.

Computer Assisted Analysis of Procedure Coding Systems

This report summarizes a 3-phase, 6-year project undertaken to assist the Health Care Financing Administration's (HCFA's) development of a standard procedure coding system for use by Medicare Part B carriers to determine Part B benefit payments to physicians and suppliers of Part B services. The 20 major deliverables are described, as are the results from a mechanism based on quality control methods used to monitor utilization and cost during the initial year of usage of HCFA's common procedure coding system (which is based on the American Medical Association's Current Procedure Terminology) by Medicare Part B carriers in three States (South Carolina, Indiana, and Washington). Order by accession no. PB86165305/AS; cost is $9.95 for paper copy, $5.95 for microfiche.

The Implementation of the Competition Demonstrations: A Report from the National Evaluation of the Medicare Competition Evaluation

This report was produced by Mathematica Policy Research, Inc. under contract to the Health Care Financing Administration as part of the National Medicare Competition Evaluation. Implementation experiences of 20 health maintenance organization's (HMO's) that participated in the Medicare Competition Demonstrations are examined by plan and market area characteristics. Site visit interviews with key HMO personnel and aggregate quarterly reports supplied by the plans were the primary data sources for the report. Organizational characteristics of the plans, and market areas in which they operated, are discussed. Benefit packages offered, marketing strategies used, and changes made in facilities design, staffing, quality assurance and utilization review procedures, and enrollment procedures to accommodate increased enrollment of the elderly are presented and discussed. In addition, the degree of success the plans had in meeting their enrollment and utilization goals is analyzed by plan and market area characteristics. Order by accession no. PB86180015/AS; cost is $16.95 for paper copy, $5.95 for microfiche.

A Proposal to Relieve Financial Distress at a Congested Urban Medical Center/The Implementation of a County Operated Prepaid Health Plan

This report is a study of the implementation and operation of the Neighborhood Health Plan during the period March 1, 1983 through December 31, 1984. The objective of this project was to relieve the financial distress of the Los Angeles County Medical Center through the implementation of cost-effective health services delivery system, more efficient management and administrative practices, and by obtaining increased revenue for Medi-Cal ineligible patients. Order by accession no. PB86180007/AS; cost is $22.95 for paper copy and $5.95 for microfiche.

A Study of the Impact of Medicare's Hospital Prospective Payment System Upon the Blood Banking Industry

This study focuses on the possible effects of the Medicare prospective payment system on the blood banking industry. It is descriptive in purpose and exploratory in nature. Order by accession no. PB86180155/AS; cost is $16.95 for paper copy, $5.95 for microfiche.

A Study of the Role of Physician Prices in a Medicaid Program, California, 1976-78: Review of Project Goals and Findings

This report describes and summarizes the conclusions from five major policy research papers developed during a 5-year study of the Medicare care used by the Medicaid population in California. Order by accession no. PB86180197; cost is $9.95 for paper copy, $5.95 for microfiche.

Aspects of Physician Behavior, Service Delivery, and Payment Methods in Medicare and Medicaid

This report summarizes the findings from several years of studies of California physicians' Medicare and Medicaid claims-billing experience and multi-State comparisons of 1980 Medicaid and Medicare allowances of five general areas: 1) the impact of the Medicare Economic Index upon physicians, and beneficiary liability and program outlays; 2) how reasonable charge allowances affect physician Medicare assignment taking and Medicaid participation; 3) the inequality of Medicare and Medicaid physicians reimbursement rates; 4) changes in the patterns of providing pathology services; and 5) the relationship between reimbursement incentives and geographic mobility of physicians. Order by accession no. PB86180189/AS; cost is $11.95 for paper copy, $5.95 for microfiche.

Feasibility of Using CPT-4 Codes for Diagnosis-Related Group Assignment of Surgical Patients

This study examined the feasibility of assigning Medicare surgical patients to diagnosis-related groups based on the CPT-4 procedure codes obtained from physician billing forms. Order by accession no. PB86180171; cost is $16.95 for paper copy, $5.95 for microfiche.

Physician Use of Ambulatory Care Resources in a Prepaid Group Practice Health Maintenance Organization

This study examined the extent of variation in physician behavior concerning the use of outpatient medical care resources in a large prepaid group practice health maintenance organization. Order by accession no. PB86180163; cost is $16.95 for paper copy, $5.95 for microfiche.

Physician Involvement in Hospital Emergency Rooms and Outpatient Departments: Final Report

This is a descriptive statistical analysis of physician involvement in hospital emergency rooms and outpatient departments. Data from the 1984-85 National Physicians' Practice Cost and Income Survey and various secondary sources (Area Resource File; American Medical Association Physician Master File) were examined to analyze and compare emergency medicine specialists and other specialists in their involvement in emergency room/outpatient departments (ER/OPD's). Relationships studied were physician specialty, employment status, level of involvement in ER/OPD's, sex, race, practice costs, income, and hospital physician participation agreement program. Order by accession no. PB86164850/AS; $11.95 for paper copy, $5.95 for microfiche.

The State of Connecticut's Final Report for the Health Care Financing Administration/National Institute of Alcohol and Alcoholism Abuse Demonstration for Treating the Elderly Alcohol Abuser

Connecticut, with 11 nonprofit community-based alcohol treatment programs, was a prime State for the implementation of the Health Care Financing Administration/National Institute on Alcohol Abuse and Alcoholism Services Demonstration. The primary goals of the Demonstration were to organize an effective outreach program that would attract more of the elderly alcohol abusers to treatment, and to determine if the participating programs were able to treat the elderly alcohol abuser at a cost savings to the Health Care Financing Administration over the traditional Medicare approved treatment in a hospital setting. Order by accession no. PB86184827/AS; cost is $16.95 for paper copy, $5.95 for microfiche.

An Exploration of Physician Behavior in Secondary Labor Markets

Nursing home and house call visits constitute a secondary market for physician services, characterized by low pay, poor working conditions, and fewer opportunities for advancement. This study examined the factors influencing the physician's decision to make these types of visits. Only 47 percent of sample physicians had made any nursing home visits during the previous week of practice, and 43 percent any house calls. Physicians enter this market only when forced to do so by competition. As a result, physicians in the nursing home and house call markets were found to be less well trained on average than other physicians. In particular, they tended to be older, less specialized, and (in the case of nursing home visits) Third World medical school graduates. Although nursing home and house call reimbursement levels averaged as much or more as those for office visits, they were apparently still too low to offset the high travel costs associated with making these two types of visits. Physicians were more likely to make nursing home visits and house calls when travel distances were shorter. Order by accession no. PB86195286/AS; cost is $11.95 for paper copy, $5.95 for microfiche.

Information available on National Long-Term Care Survey

The data files and documentation for the National Long-Term Care Survey and the National Survey of Informal Caregivers of 1982 are now available from the National Technical Information Service:

National Technical Information Service
Document Sales
5285 Port Royal Road
Springfield, Virginia 22161
Telephone: (703) 487-4650

The full public use package consists of a single data tape which contains three data files, along with two-part documentation. The data tape includes a file of the screening interviews, one of the detailed interviews with those found during the screening interviews to have functional limitations, and one of the interviews with the informal caregivers. The first part of the documentation covers the screening interviews and the detailed interviews; the second part covers the interviews with caregivers.

To obtain a copy of the data tape, request the National Long-Term Care Survey/National Survey of Informal Caregivers of 1982, accession number PB86-161775. The cost is $275.00 a copy. Part I of the documentation is for the National Long-Term Care Survey of 1982, accession number PB 86-161783, and costs $40.95. Part II of the documentation is for the National Survey of Informal Caregivers of 1982, accession number PB 86-161791, and costs $64.95.

Please note that the material does not include any analytical results, but is limited to the data files and documentation. We would appreciate receiving copies of analyses which use the data, as well as information on problems or difficulties encountered in such use. If you prefer to send copies while the material is still in draft, we will try to provide comments to you. Send such information and analyses to:

Paul D. Gayer
HHS/OS/ASPE/SSP
Room 410E, Humphrey Building
200 Independence Avenue, SW.
Washington, D.C. 20201

Final data tapes have not yet been received from the U.S. Bureau of the Census for the 1984 National Long-Term Care Survey, and public availability of that data is still some months away. For information on the 1984 Survey, write to:

Joel Broida
HCFA Office of Research
2C13 Oak Meadows
6340 Security Boulevard
Baltimore, Maryland 21207

Statistical components handle inquires

Inquiries regarding the availability of statistical information other than those pertaining to the specific contents of articles in the *Health Care Financing Review* should be directed to the following components:

For Medicare Statistics

Statistical Information Services Branch
Office of Statistics and Data Management
Bureau of Data Management and Strategy
Room 1-F-2, Oak Meadows Building
6325 Security Boulevard
Baltimore, Maryland 21207
Telephone: (301) 594-6705

For Medicaid Statistics

Division of Medicaid Cost Estimates
Office of Actuarial Analysis
Office of the Actuary
Room 1-K-1, Equitable Building
1705 Whitehead Road
Baltimore, Maryland 21207
Telephone: (301) 597-6107
(301) 597-1417

Grants and Contracts

The Health Care Financing Administration (HCFA) administers a grants and contracts program for research and demonstration projects through the Office of Research and Demonstrations (ORD).

The following list contains information on new ORD contracts awarded in the latter part of fiscal year 1986. Other grants and contracts projects have been included in earlier issues of the *Health Care Financing Review.*

As projects are completed, the final reports are placed with the National Technical Information Service for public access. Further information may be obtained from:

National Technical Information Service
Document Sales
5285 Port Royal Road
Springfield, Virginia 22161
(703) 487-4650

Project area: Quality of care
Category: Long-term care

Title:
The New York State integrated quality assurance system for residential health care facilities: The next step after case-mix reimbursement.

Project number:
11-C-98925/2-01

Contractor/Grantee:
State of New York
Department of Social Services
Division of Medical Assistance
40 North Pearl Street
Albany, New York 12247

Project director:
Brian Hendricks

Federal project officer:
Catherine Moylan

Description:
The project is designed to develop and test a quality assurance system that links quality assurance (including Federal and State utilization control and survey/certification) with reimbursement in nursing homes. The project coincides with the Health Care Financing Administration's development of the Patient Care and Services (PaCS) survey process, and will allow a comparison of the existing survey system, PaCS, and the proposed system. This demonstration will provide us the opportunity to develop and test a patient-oriented, integrated quality assurance system and, at the same time, compare this new system to both the current one and the newly developed PaCS survey process.

Title:
A proposed study to assess the impact of the prospective payment system (PPS) on the quality of long-term care in nursing homes and home health agencies.

Project number:
15-C-98971/8-01

Contractor/Grantee:
University of Colorado
Health Science Center
1355 South Colorado Boulevard
Denver, Colorado 80222

Project director:
Peter W. Shaughnessy

Federal project officer:
Philip Cotterill

Description:
This project proposed to examine patient-level process indicators of quality of care provided to skilled nursing facilities and home health agency patients before and after PPS, assess pre/post-PPS differences in patient care practices and outcomes, and to recommend how to further assess the impact of PPS on long-term care. This study will provide information regarding possible changes in the quality of long-term care services since the implementation of PPS. The study will help address the allegation that patients have been discharged "sicker and quicker" leading to a decline in quality of care.

Title:
A demonstration and evaluation of direct physician capitation under the Medicare program.

Project number:
95-C-98919/3-01

Contractor/Grantee:
Mathematica Policy Research, Inc.
600 Maryland Avenue, SW., Suite 550
Washington, D.C. 20024

Project director:
Kathryn Langwell

Federal project officer:
Spike Duzor

Description:
This project proposes to develop, implement, and evaluate a demonstration under which physicians would be paid a capitated amount for Medicare Part B services. The first 12 months would be used to complete the design of the demonstration, the next 24 months would be the operational phase, with the evaluation to conclude 1 year after the operational phase has ended.

Project area: Hospital payment
Category: Case-mix studies

Title:
Diagnosis-related group (DRG) refinement and diagnostic-specific comorbidities and complications: A synthesis of current approaches to patient classification.

Project number:
15-C-98930/1-01

Contractor/Grantee:
Yale University
School of Organization and Management
P.O. Box 1A, 12 Prospect Place
New Haven, Connecticut 06520

Project director:
James Richardson

Federal project officer:
Harry Savitt

Description:
This project proposes to examine the effect of patient comorbidities and complications on hospital resource use. It will investigate whether the relationship between selected hospital diagnoses and hospital utilization depends on the presence of other diagnoses. It also seeks to make recommendations to modify current DRG's using diagnosis-specific comorbidities and complications to define the more complex types of patients with high levels of utilization.

Title:
A diagnosis-related group (DRG)-based case-mix analysis of oncology care in comprehensive cancer centers, teaching hospitals, and community hospitals.

Project number:
15-C-98922/1-01

Contractor/Grantee:
Brandeis University
Florence Heller Graduate School
415 South Street
Waltham, Massachusetts 02254

Project director:
Joanna Lion

Federal project officer:
John Langenbrunner

Description:
This project has two goals: The first is to examine and compare DRG case mix, diagnostic case mix, distribution of resource costs within DRG's, extent of variance in cost explained by DRG's, and the ability of disease staging to better explain variations in resource levels across four types of inpatient cancer settings: comprehensive cancer centers, exempted and not exempted under the prospective payment system (PPS); community hospitals; and teaching hospitals. The second is to investigate variation in costs in selected oncology conditions through consideration of a variety of measures and factors. This project will help develop a case-mix method for bringing exempted cancer facilities under PPS, and will compare competing case-mix methods; it will also refine several DRG problem areas (e.g., high-cost variance) for present cancer and cancer-related DRG's.

Project area: Beneficiary awareness and prevention
Category: Child health

Title:
Preventive health care for Medicaid children: Related factors and costs.

Project number:
18-C-98897/5-01

Contractor/Grantee:
American Academy of Pediatrics
141 Northwest Point Boulevard, Box 927
Elk Grove Village, Illinois 60007

Project director:
Gretchen V. Fleming

Federal project officer:
Martin Ruther

Description:
This project proposes to study the types of preventive care Medicaid children enrollees receive (including sources and costs of the care), the factors promoting receipt of preventive care, and the effects of preventive health care for Medicaid children on subsequent use of health care, Medicaid costs, and quality of care received.

Project area: Program analysis and refinements
Category: Program analysis

Title: The cause and failure to transplant cadaveric human organs.

Project number:
17-C-98728/1-01

Contractor/Grantee:
Brandeis University
Florence Heller Graduate School
415 South Street
Waltham, Massachusetts 02254

Project director:
Jeffrey M. Prottas

Federal project officer:
Paul Eggers

Description:
This project will attempt to determine the reasons for the high rate (19.6 percent) of wastage of cadaveric kidneys in the United States and make recommendations to reduce this loss in the future. Many studies have shown that kidney transplantation is beneficial both clinically and from a cost perspective. The major barrier to increased transplantation is organ availability. This study, through its measure of determinants of, and cures for, cadaver organ waste, could help increase the efficiency of the organ procurement system.

Project area: State programs for long-term care
Category: Nursing home prospective payment

Title:
Design, implementation, and evaluation of a prospective case-mix system for nursing homes in Massachusetts.

Project number:
11-C-98924/1-01

Contractor/Grantee:
Commonwealth of Massachusetts
Department of Public Welfare
Medical Assistance Division
600 Washington Street
Boston, Massachusetts 02116

Project director:
Paul Dreyer

Federal project officer:
Dana Burley

Description:
This project proposes to design, implement, and evaluate a prospective case-mix payment system for a random sample of nursing homes in Massachusetts. It proposes to develop and test incentives for nursing homes to admit and treat patients who need extensive care while ensuring quality of care.

Project area: Alternative payment systems
Category: Alternative payment systems

Title:
An employment-based plan in the Medicare program.

Project number:
95-C-98912/3-01

Contractor/Grantee:
United Mine Workers of America
1950 Benefit Trust
2021 K Street, NW.
Washington, D.C. 20006

Project director:
James Richardson

Federal project officer:
Eric Nevins

Description:
This project proposes to develop and test an employment-based (union) capitation plan in the Medicare program that would be operated on an at-risk basis for both Part A and Part B services, and under which the United Mine Workers of America (UMWA) would be both carrier and intermediary for all its members eligible for Medicare. This proposal would test the concept of a voucher being provided to the union for all its retirees eligible for Medicare. Under this model, UMWA would be at risk for all its Medicare retirees.

Administrator's Decisions

Under Section 1878(f) of the Social Security Act, as amended, a Provider Reimbursement Review Board (PRRB) decision is final unless the Secretary, Department of Health and Human Services, on his own motion, and within 60 days after the provider is notified of the Board's decisions, reverses, affirms, or modifies the Board's decision. The review function has been delegated to the Administrator/Deputy Administrator of the Health Care Financing Administration.

The two indexes are lists of the Administrator's decisions rendered on review of PRRB decisions and of PRRB decisions the Adminstrator elected not to review. These indexes are in numeric order by PRRB decision number. They also state the name of the provider, issues involved, and date of Administrator's action.

Numeric index of Administrator's final decisions rendered on review of PRRB decisions—April 1, 1986, through June 30, 1986

86-D55	*Stringfellow Memorial Hospital*—Patient library services (03/26/86)
86-D59	*LaGuardia Hospital*—Routine cost limits (04/03/06)
86-D60	*Miami Heart Institute*—Accrued sick pay; Useful lives (04/10/86)
86-D61	*National Medical Enterprises, Inc.*—Equity capital (04/10/86)
86-D64	*Salem Hospital*—Dietary service costs; Ancillary service costs (04/18/86)
86-D65	*Shoals Hospital*—Standby costs (04/17/86)
86-D70	*South Side Hospital*—Loss on sale of securities; Offset of interest income (04/30/86)
86-D74	*Bowdon Area Hospital*—Capitalized costs (05/09/86)
86-D83	*St. Mary's Hospital*—Pension expense; Interest expense (06/10/86)
86-269	*General Hospital of Everett*—Jurisdiction (05/19/86)

Numeric index of Administrator's election to decline review of PRRB decisions—April 1, 1986, through June 30, 1986

86-D62	*Mississippi Patient Telephone Group*—Telephone costs (03/25/86)
86-D63	*Baptist Memorial Hospital*—Laboratory charges; Advertising costs; Telephone costs (03/26/86)
86-D66	*Mercy Medical Center*—Alcoholic therapy costs (04/01/86)
86-D67	*Reed City Hospital*—Bad debts; Collection agency fees (03/31/86)
86-D68	*Chestnut Hill Hospital*—Interest expense (03/31/86)
86-D69	*Rogue Valley Memorial Hospital*—Routine costs (04/01/86)
86-D71	*Bethesda Hospital*—Useful life guidelines; administrative and general costs; malpractice costs (04/04/86)
86-D72	*Home Health Agency of South Broward, Inc.*—Consulting and EDP costs; Advisory Board fees; Organization expenses (04/10/86)
86-D73	*Lewis County Hospital*—Standby costs (04/08/86)
86-D75	*Cobb Memorial Hospital*—Director's fees; Leasing of physician's office building (04/16/86)
86-D76	*Puget Sound Hospital*—Malpractice insurance costs (04/01/86)
86-D77	*Cambridge Hospital Association*—Routine per diem limitations (05/09/86)
86-D78	*Metropolitan General Hospital*—Director's fees (05/09/86)
86-D79	*Walter O. Boswell Memorial Hospital, Inc.*—Interest expense; Interest income offset; malpractice insurance costs (05/05/86)
86-D80	*General Hospital of Fort Walton Beach*—Lease payment tax (05/09/86)
86-D81	*Ross Loos Hospital*—Malpractice insurance costs (04/30/86)
86-D82	*Salem District Hospital*—Planning fees; Emergency room physician's billing cost (05/09/86)
86-D84	*Santa Rosa Convalescent Center*—Sale of facility (06/01/86)

Contributors

E. Kathleen Adams, Ph.D., is currently a health economist with the State Rating Bureau in Massachusetts. Her article in this issue was prepared while she was senior economist at the Center for Health Services Research, University of Colorado Health Sciences Center, and Assistant Professor in the Department of Preventive Medicine and Biometrics, School of Medicine. Her research interests center on the evaluation and design of health care financing policies.

Ralph Andreano, Ph.D., is Professor of economics at the University of Wisconsin-Madison, Chairman of the Department, and a member of the University's Institute for Research on Poverty. Dr. Andreano was chief economist of the World Health Organization, and served as Administrator for the Wisconsin Division of Health. He is also a member of the Institute of Medicine of the National Academy of Sciences.

Susan J. Dayno, M.S., is currently a health care data consultant in the cost-containment division of John Hancock Mutual Life Insurance Company. Ms. Dayno was previously a research assistant for the health care research unit of Boston University Medical School. She is a graduate of the University of Pennsylvania and received her M.S. from the Harvard School of Public Health.

Pamela Doty, Ph.D., is a senior policy analyst in the Office of Legislation and Policy. She is currently managing an international comparative study of long-term care policies which the Health Care Financing Administration (HCFA) is conducting for the International Social Security Association. Previously, she worked on HCFA's report to Congress on the Medicare skilled nursing facility benefit.

Janice L. Dreachslin, Ph.D., is Director in Consulting Services, Commission on Professional and Hospital Activities, Ann Arbor, Michigan.

James Fisher, M.A., is a statistician in Consulting Services, Commission on Professional and Hospital Activities, Ann Arbor, Michigan.

Paul M. Gertman, M.D., is chief scientist at the Health Data Institute in Lexington, Massachusetts. At the time the study was conducted on which the article in this issue is based, he was Associate Professor of Medicine at Boston University Medical Center.

Charles Helbing is Chief of the Information Services Branch, Division of Program Studies, Office of Research, Office of Research and Demonstrations, Health Care Financing Administration. His current research work focuses on developing statistical reports that provide program information on current health care issues, and providing data support and information related to program information inquiries.

Thomas Helminiak, Ph.D., is a research associate at the University of Wisconsin-Madison's Institute for Research on Poverty. He has extensive international experience and has served as a consultant to various agencies, including the World Health Organization, the Asian Development Bank, and the World Bank.

Will Kirby is a senior research analyst in the Information Services Branch, Division of Program Studies, Office of Research, Office of Research and Demonstrations, Health Care Financing Administration. He is currently working on the Medicare Catastrophic Task Force and the impact of the Medicare prospective payment system on beneficiaries, providers, and utilization.

Bernard E. Kreger, M.D., M.P.H., is Associate Clinical Professor of Medicine at Boston University School of Medicine and a member of both the General Internal Medicine Section and the Section of Preventive Medicine and Epidemiology in the Department of Medicine at University Hospital, Boston. He received his doctor of medicine degree from Western Reserve University and his master of public health degree from Harvard. Over the past decade, much of his research has been concerned with designing clinically appropriate criteria to assess the use of health care facilities and resources. He is also involved in studies of the epidemiology of cardiovascular disease and cancer, as part of the ongoing Framingham Study.

Vikki Latta is a statistical information specialist in the Information Services Branch, Division of Program Studies, Office of Research, Office of Research and Demonstrations, Health Care Financing Administration. Her work has centered around the development and implementation of a rapid data retrieval system.

Helen Lazenby is a program analyst in the Division of National Cost Estimates, Office of the Actuary, Health Care Financing Administration. She is currently involved in the preparation of spending estimates for the National Health Accounts and has been involved in analyzing health spending for the aged.

Gregory M. Lenhart, M.S., senior statistician at the Health Data Institute, was associated with the Boston University Health Care Research Unit at the time this study was conducted. He has analyzed numerous medical record audit, hospital discharge abstract, and health care claims data bases. He received his master of science degree in statistics from the Massachusetts Institute of Technology.

Katharine R. Levit is an economist in the Division of National Cost Estimates, Office of the Actuary, Health Care Financing Administration. In addition to preparing spending estimates for the National Health Accounts, she has developed estimates of health spending by type of care for individual States.

Korbin Liu, Sc.D., is a senior research associate at The Urban Institute where he is working on studies on the risks and costs of long-term care. While working on the Health Care Financing Administration's report to Congress on the Medicare skilled nursing facility benefit, he was a senior policy analyst in the Office of Legislation and Policy.

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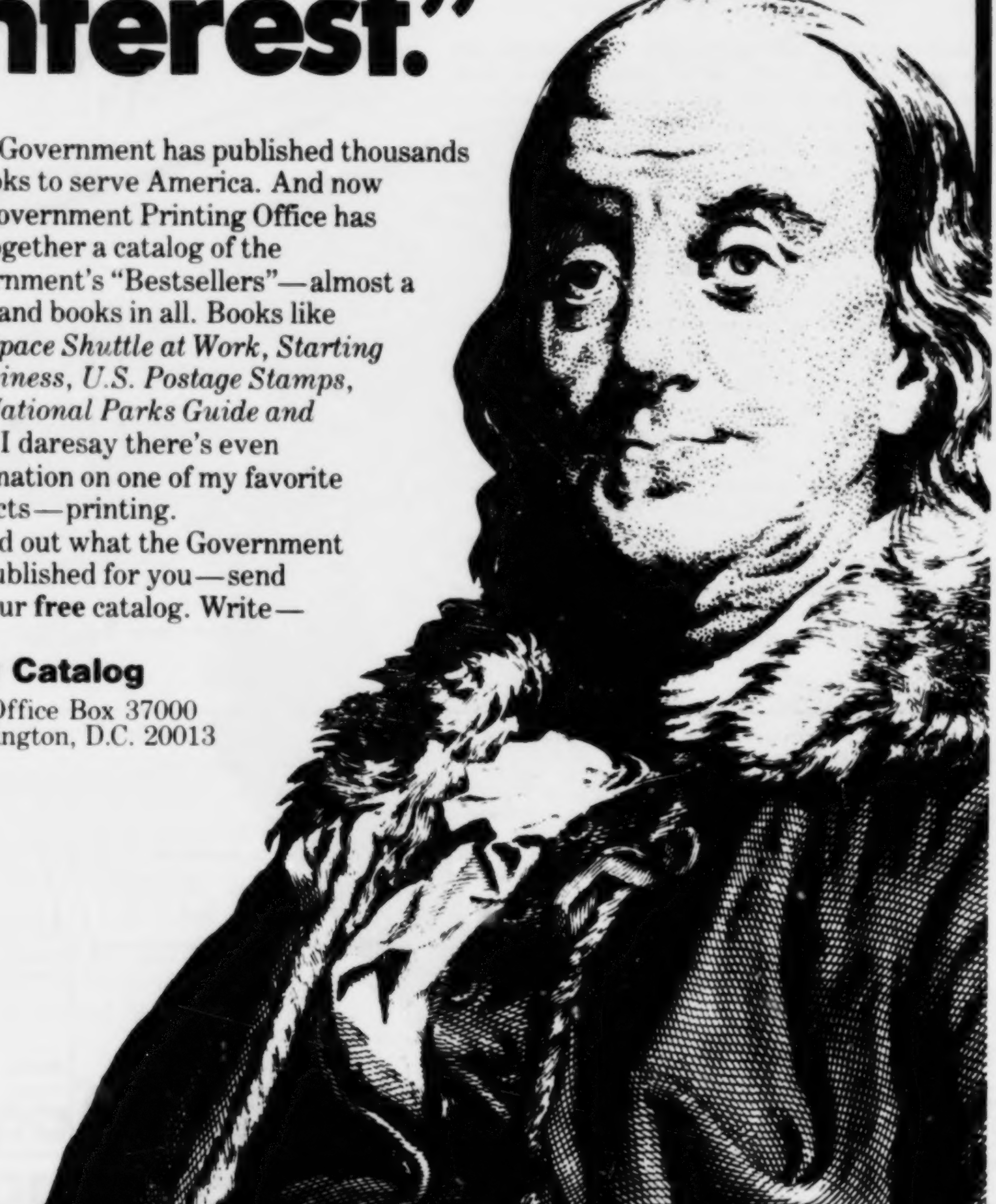

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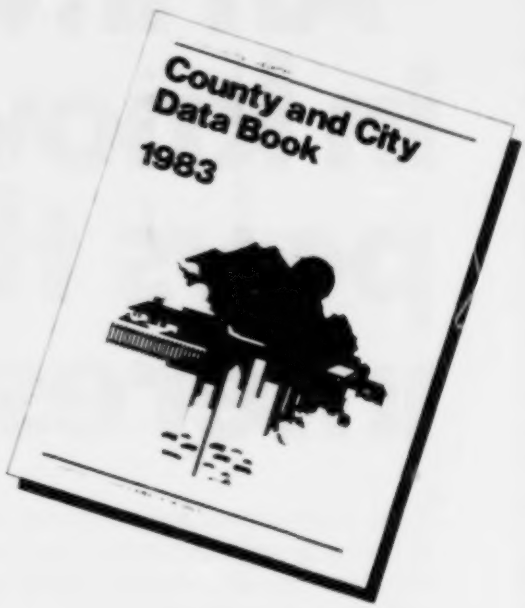

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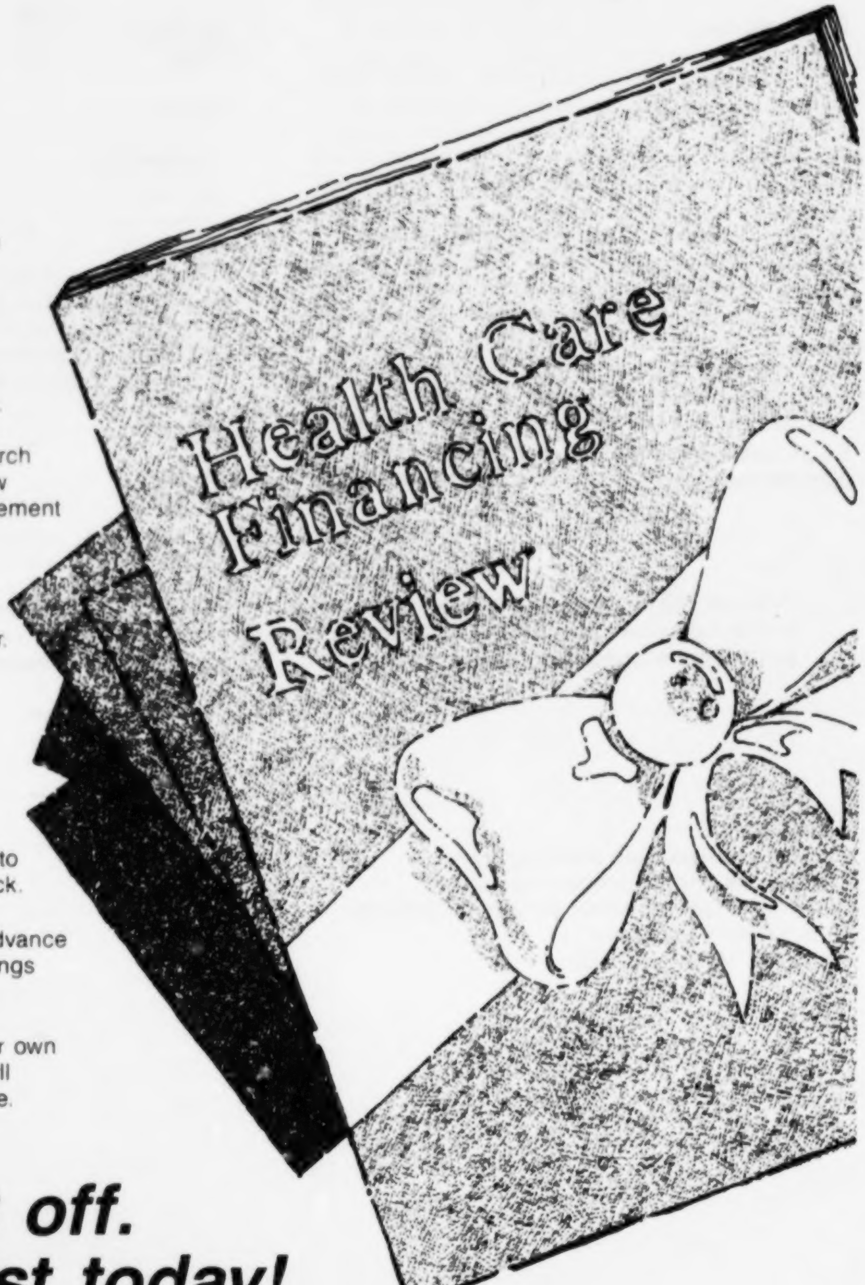

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